JULY 14, 1952

Brown - Hall

STEEL

THE WEEKLY MAGAZINE OF METALWORKING

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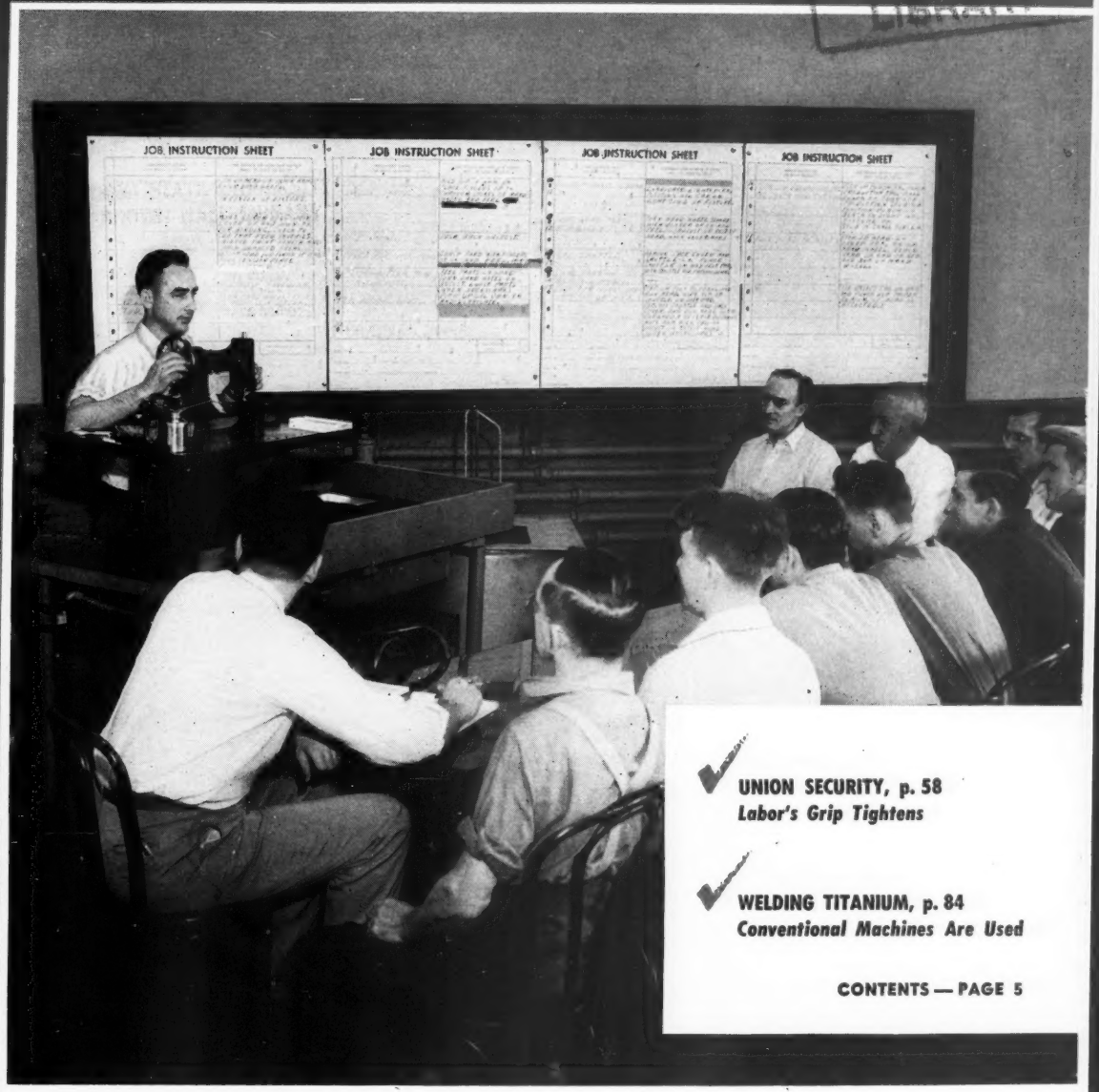

✓ **UNION SECURITY, p. 58**
Labor's Grip Tightens

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Conventional Machines Are Used

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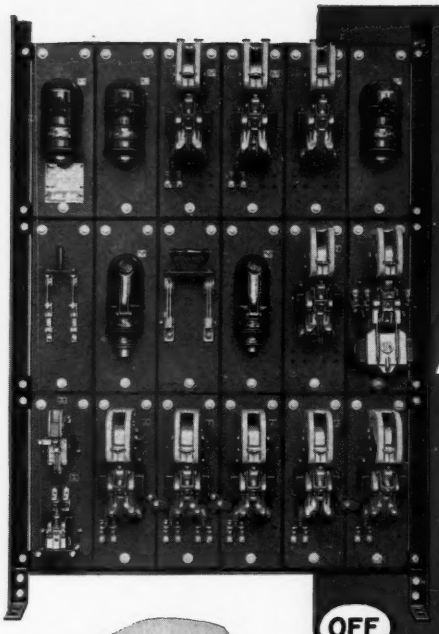


LOOK for these NAMES when buying Motor Control

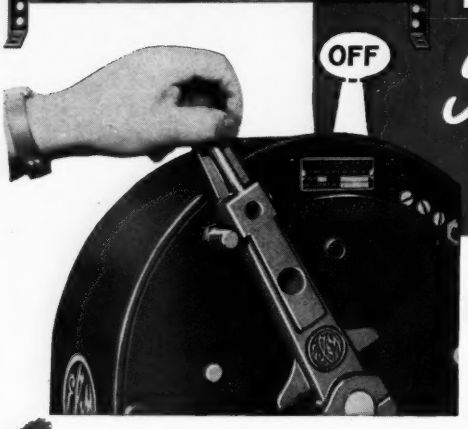
1 LINE-ARC Contactors
2 TIME-CURRENT Acceleration (D-c)
3 FREQUENCY RELAY Acceleration (A-c)
4 WRIGHT CIRCUIT Hoist Control (D-c)
5 YOUNGSTOWN Hoist Limit Stops
6 TYPE WB Brakes
7 CAM Master Switches
8 MANUAL-MAGNETIC Disconnect Switches
9 CONTRA-TORQUE Hoist Control (A-c)
10 TAB-WELD Resistors

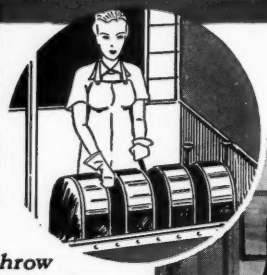
These FUNCTIONAL NAMES Speak for Themselves

CAM Master Switches *for speed control*

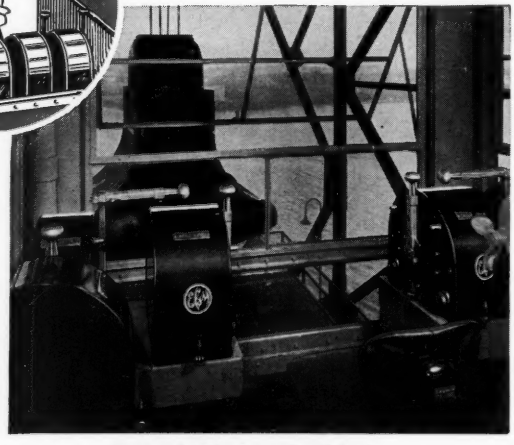
Short Throw, Less Tiring

easier manipulation speeds output





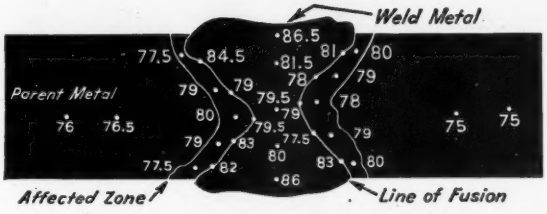
Ever popular with operators, EC&M *short-throw* Cam Master Switches have many features which make manipulation easy and result in improved operation. These are: Notching arrangement consists of two rails and two rollers—makes each speed point distinct and "off-point" easy to find. End-play clearance at neutral position gives a "lift" for quick inching between off and first points. Counterweight below main shaft offsets weight of operating arm—maintains speed point selected and prevents self-advance of the arm if the master switch is jarred or bumped. Overlapping cover excludes exterior dust. Large diameter cams speed opening and closing of coin–silver contacts. Many of these CAM Master Switches can be closely grouped because of their narrow width. For smooth, easy manipulation, specify EC&M CAM Master Switches.



Operator's Cab of new Ore Unloader with EC&M CAM Master Switches.

THE ELECTRIC CONTROLLER & MFG. CO.
2698 EAST 79TH STREET • CLEVELAND 4, OHIO

This Low-Alloy High-Strength Steel Welds as Readily as Carbon Grades



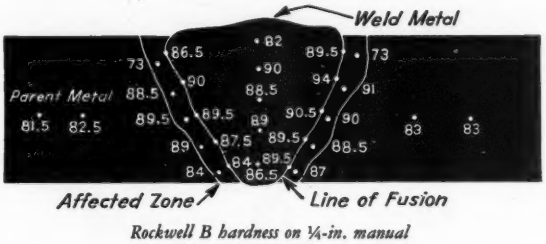
Rockwell B hardness on ½-in. manual arc-welded plate of Mayari R, stress-relieved at 1050 deg F.

Mayari R is a low-alloy, high-strength steel that can be welded by the ordinary methods used for plain carbon steel . . . electric-resistance, including spot-, seam-, and flash-butt . . . electric-arc, including metallic, carbon, and inert-arc . . . automatic-submerged-arc . . . and gas-welding processes.

There is no difference in the equipment, the technique, or the welding speed with Mayari R.

A non-air-hardening grade, Mayari R shows no appreciable hardening from welding temperatures. Results of tests made on welded Mayari R indicate that the welds are equally as strong as the parent metal.

Full information on welding and fabricating this steel is readily available for your files. Write or phone any Bethlehem sales office and ask for a copy of Mayari R Catalog 259.



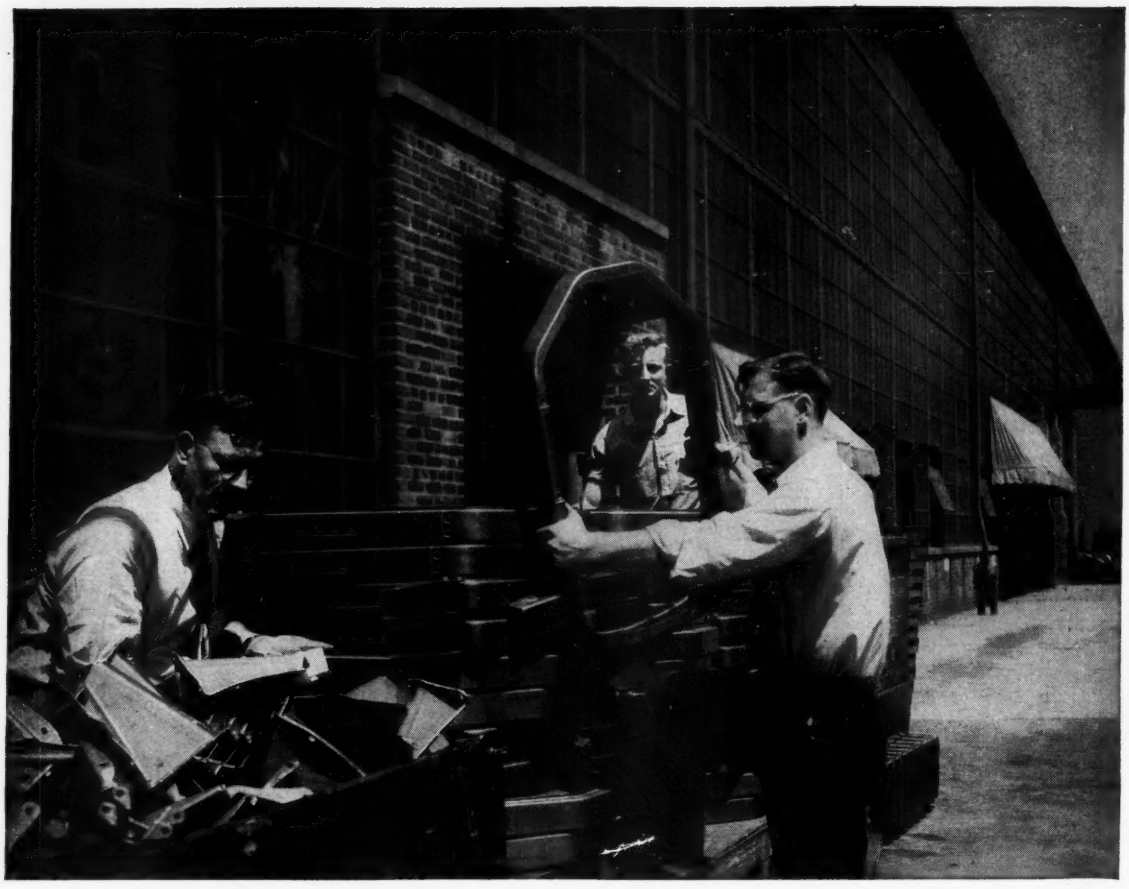
Rockwell B hardness on ¼-in. manual arc-welded Mayari R plate, as welded.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

★ BETHLEHEM STEEL ★

Mayari R *makes it lighter... stronger... longer lasting*



Look into this to cut parts cost without cutting quality

The object of this inspector's interest at Barium's Geometric Stamping Company might prove interesting, and profitable, to you.

He's examining a metal part (a truck radiator frame) that's lighter, smarter and *lower-cost* because Geometric has years of know-how on precision stampings and assemblies.

It may pay you to investigate what this Barium subsidiary can do for you by stamping, if you use medium and heavy metal parts.

If stamped parts can't solve your particular steel need, you'll probably find the answer elsewhere in the Barium family. Barium's fifteen member companies, working in steel, supply industry with steel in many forms, and are ready to work as a self-contained unit to speed urgently needed orders.

Address your steel problem to Barium Steel Corporation, 25 Broad Street, New York City.

BOLTS — Bayonne Bolt Corporation

STEEL PLATE — Central Iron and Steel Company

PIG IRON — Chester Blast Furnace

CRANES AND HOISTS — Clyde Iron Works, Inc.

SPRINGS — Cuyahoga Spring Company

BOLTS AND NUTS — Erie Bolt and Nut Company

METAL STAMPINGS — Geometric Stamping Company

DROP FORGINGS — Globe Forge, Inc.

HEAVY FLAT DIE FORGINGS — Industrial Forge and Steel, Inc.

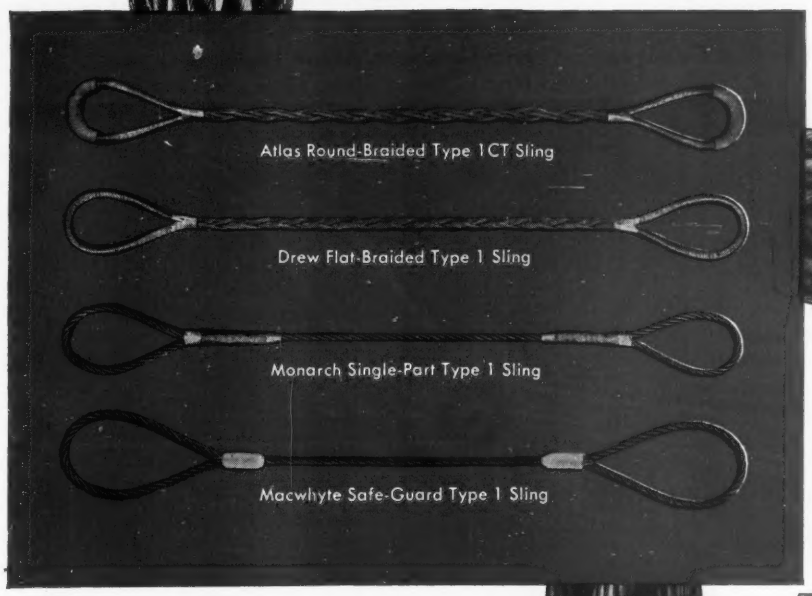
AIRCRAFT ENGINES AND PRECISION ASSEMBLIES — Jacobs Aircraft Engine Company

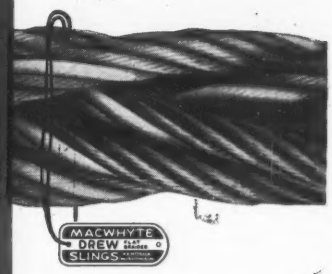
MARINE DIESEL AND GASOLINE ENGINES — Kermath Manufacturing Company, Kermath Limited (Canada)

STRUCTURAL SHAPES AND STEEL FABRICATIONS — Phoenix Bridge Company, Phoenix Iron and Steel Company

BARGES AND TUGS — Wiley Manufacturing Company

Slings...any type...any size your job requires


Atlas Round-Braided Type 1CT Sling
Drew Flat-Braided Type 1 Sling
Monarch Single-Part Type 1 Sling
Macwhyte Safe-Guard Type 1 Sling



Macwhyte Slings

Here are four of the hundreds of slings pictured and listed in the newest Macwhyte Sling Catalog. All these slings are made to order in any size with fittings needed for your job. All three types of body are available: round-braided, flat-braided, single-part. Macwhyte has worked with hundreds of sling users toward more efficient materials handling. Our engineers are ready to study your sling needs and make recommendations.

For cranes and hoists specify PREformed Monarch Whyte Strand Crane Rope made by Macwhyte.

Manufacturers of Internally Lubricated PREformed Wire Rope, Braided Wire Rope Slings, Aircraft Cable, Safe-Lock Assemblies, Monel Metal and Stainless Steel Wire Rope.
Mill depots: New York • Pittsburgh Chicago • Minneapolis • Fort Worth • Portland • Seattle • San Francisco • Los Angeles • Distributors throughout U.S.A.

New Macwhyte Sling Catalog.
Send today for complete sling catalog containing detailed information about slings for every need.

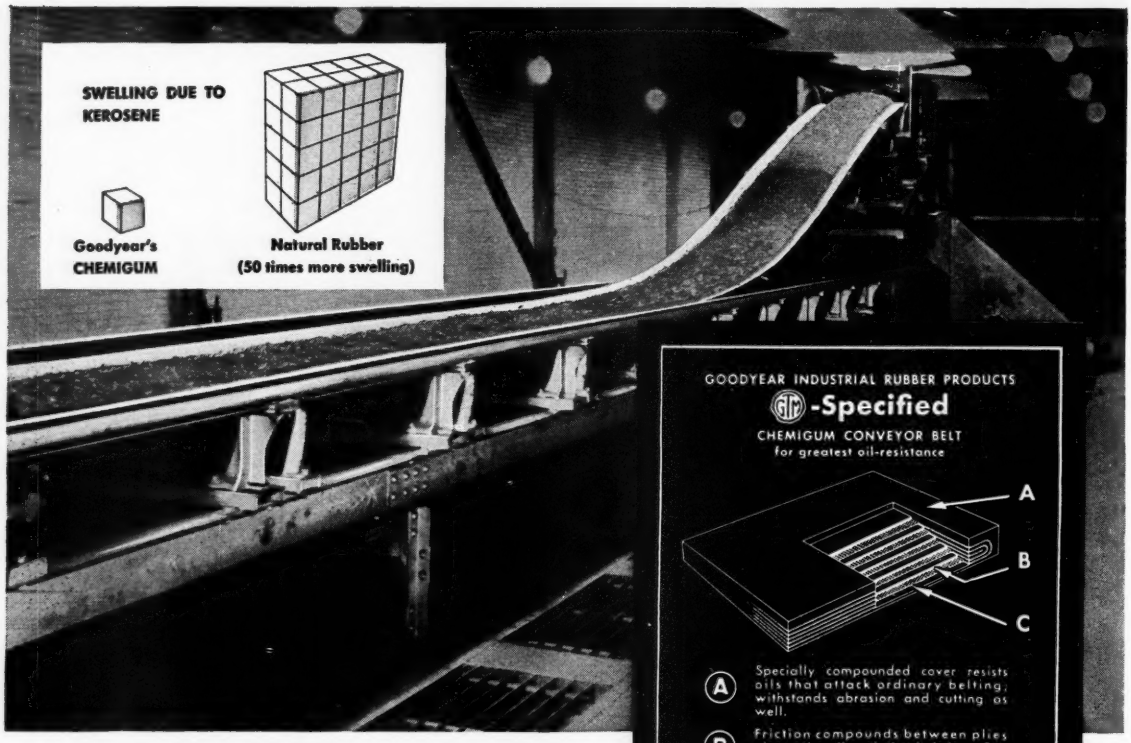
10148

Member National Safety Council

Here's the LONGEST-LASTING BELT for handling Oil-Treated Fuel

HERE'S graphic evidence of the oil-resistance built into the covers and carcass of CHEMIGUM conveyor belts—designed by the G.T.M.—Goodyear Technical Man—for use in service where severe oil and grease conditions cause premature failure of conventional belts.

Tests with kerosene show that Goodyear CHEMIGUM covers swell only 2% as much as high-grade conveyor covers made from natural rubber. (See Chart.) CHEMIGUM will also resist oil far better than many other oil-resisting synthetics used in belts. When destructive effects of such solvents are present, consult the G.T.M. for full details, or write Goodyear, Akron 16, Ohio.


SWELLING DUE TO KEROSENE
Goodyear's CHEMIGUM
Natural Rubber (50 times more swelling)
GOODYEAR INDUSTRIAL RUBBER PRODUCTS
GTM-Specified
CHEMIGUM CONVEYOR BELT
for greatest oil-resistance
A
B
C
A Specially compounded cover resists oils that attack ordinary belting; withstands abrasion and cutting as well.
B Friction compounds between plies also resist oil and give belt long flex life.
C Plies of duck reinforcement to fit individual job requirements.

LOOK FOR YOUR GOODYEAR INDUSTRIAL RUBBER PRODUCTS DISTRIBUTOR *in the yellow pages of your Telephone Directory under "Rubber Products" or "Rubber Goods." He handles Hose, Flat Belts, V-Belts, Molded Goods, Packing, Tank Lining, Rubber-Covered Rolls built to the world's highest standard of quality.*

GOODYEAR

THE GREATEST NAME IN RUBBER

Chemigum—T.M. The Goodyear Tire & Rubber Company, Akron, Ohio

This Week in Metalworking

STEEL

Vol. 131 No. 2 July 14, 1952

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Finish with Diamond
. . . ELGIN Diamond!

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for General Polishing | for Carbides

ABRASIVES DIVISION, DEPT. C
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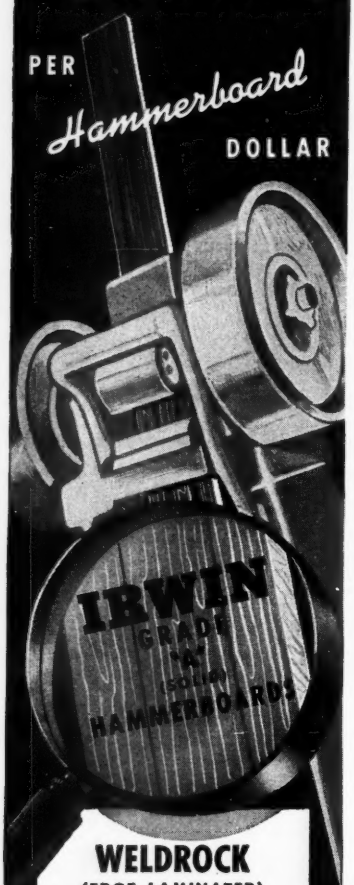
MORE FORGINGS
PER Hammerboard DOLLAR



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HAMMERBOARDS
RELEASE PINS
HELVES

Complete inventory of fully seasoned stock at all times. Immediate delivery. The largest stock of air dried hardwoods in Northwestern Pennsylvania.

IRWIN
MANUFACTURING CO.
GARLAND, PA.

Behind the Scenes...

Canned

Well, they've canned everything else. Now the Air Materiel Command is canning clothing.

Test shipments of clothing packed in steel containers have proved them cheaper and better than other types of clothing packages in general use.

Air Materiel Command claims the air-tight metal containers afford better protection against the elements and pilferage; they are fine for storage purposes; the same cans may be used again and again. Clothing to be canned are the 195 quartermaster-type items worn by airmen, such as uniforms, underwear and shoes.

We can just picture ourselves going up to our old supply sergeant and saying:

"Sergeant, we'll take a can of socks and two cans of shoes. And a can of mustard on the side."

Change of Face

If you think industry hasn't changed much, you ought to take a look through the annual report of American Locomotive Co. A quarter of a century ago, the company manufactured six products for one market. Today the firm makes regularly 28 products for nine markets. Not a single one of its products made today was manufactured by the company 25 years ago.

Cover Story

Ed Birkner, the author of this week's cover story, tells us a plaudit should go to the organization that helped him with the article on training. The organization: Training Within Industry Inc., Cleveland. TWI not long ago returned from a year's sojourn in Japan where it set up a national plan for the installation of training programs in all Japanese industries.

TWI is a group from business and industry that during World War II directed in-plant supervisory training of more than 175,000 supervisors in over 1000 American companies. The cover photo is from White Sewing Machine Corp., Cleveland.

Tall Tale

Associate Editor Vance Bell was in Chicago recently substituting for Resident Editor Erlé Ross, who was on vacation. Returning to the Stevens hotel one evening from a movie he strolled through the lobby and gradually became aware that everyone around him was a veritable giant.

Vance is no shortie himself and was amazed to find that the rest of the people in the lobby stood head and shoulders above him—and that included the women too. He says he went back over the evening mentally and was certain he hadn't been sniffing corks.

For a while it really threw him. Then he noticed that the bulletin board listed a meeting of the Chicago chapter of a tall-peoples club. As he backed to the outer wall for a better view he found the rest of the six-footers-and-under getting a child's-eye view of the proceedings.

Travelled

STEEL—or rather, parts of it—has just gone overseas via the Mutual Security Agency. That government agency has a technical digest service which sends abroad summaries of technical articles in business magazines.

Four digests of stories from this publication have just been sent. They concern a practical method of copper-brazing stainless steel without a flux explained in the Jan. 14 issue, de-tinning facilities described Jan. 28, suggestions on the thorough cleaning of aluminum surfaces which appeared Feb. 11 and an explanation of how welding electrodes can coat large surfaces, also summarized from an article in the Feb. 11 book.

Puzzle Corner

In our June 30 puzzle, Percy is married to Mame, Joe to Monica and Reginald to Genevieve. First in with that correct answer were M. S. Bailey of Machine Products Corp., Frank J. Hoegler of Motor Repair & Mfg. Co. and Charles A. Eck of Defiance Stamping Co.

Try this one: If a quantity of two digits is tripled and the digits added to the product, the result is the original quantity with the digits reversed. What is the original quantity?

Shrdlu

(Metalworking Outlook—Page 47)

MULTIPRESS®

solves another "tough one"

Feeds and Forms hard-to-handle plastic with automatic accuracy

U. S. Gasket Co. gets quality plus speed in compacting parts from Du Pont's Teflon

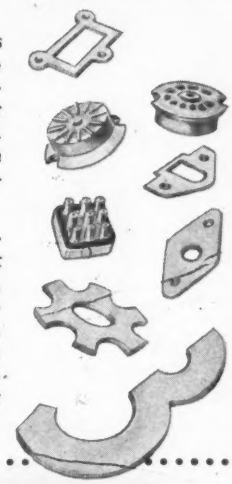
Toughness and high heat-resistance make Du Pont's Teflon an ideal plastic for many needs. But feeding the raw material to molding dies has been a problem; the granules tend to cling together in a non-fluid mass.

MULTIPRESS solved the feeding problem with its unique, shuttle-type, self-agitating feed attachment. In addition, the smooth, oil-hydraulic operation and fully adjustable ram action of Multipress brought other production gains. At cost-cutting production speeds, compacting is done with *automatically uniform results*—a necessity because most Teflon parts made at U. S. Gasket must pass micrometer tests for close-tolerance requirements.

Quick tool-changing and easy adjustment of ram stroke, speed and pressure are further advantages. With more than a thousand different dies, U. S. Gasket switches four Multipresses from one group of short-run jobs to another with minimum loss of production time.

Another feature this manufacturer likes is that Multipress provides a bottom ram to apply pressures upward giving equal pressures on top *and* bottom of parts. The four automatic Multipresses now in use at U. S. Gasket—a 25-ton, a 15-ton and two 8-ton units—are all equipped for this "double-end" ram action.

Multipress is getting better results for hundreds of manufacturers, in many different fields, because it provides smooth, rapid, low-impact pressures under accurate control—easily adjustable to the exact need. Eight frame sizes available . . . one-ton to 50-ton capacities . . . auxiliary equipment for many special needs. Write for full details.



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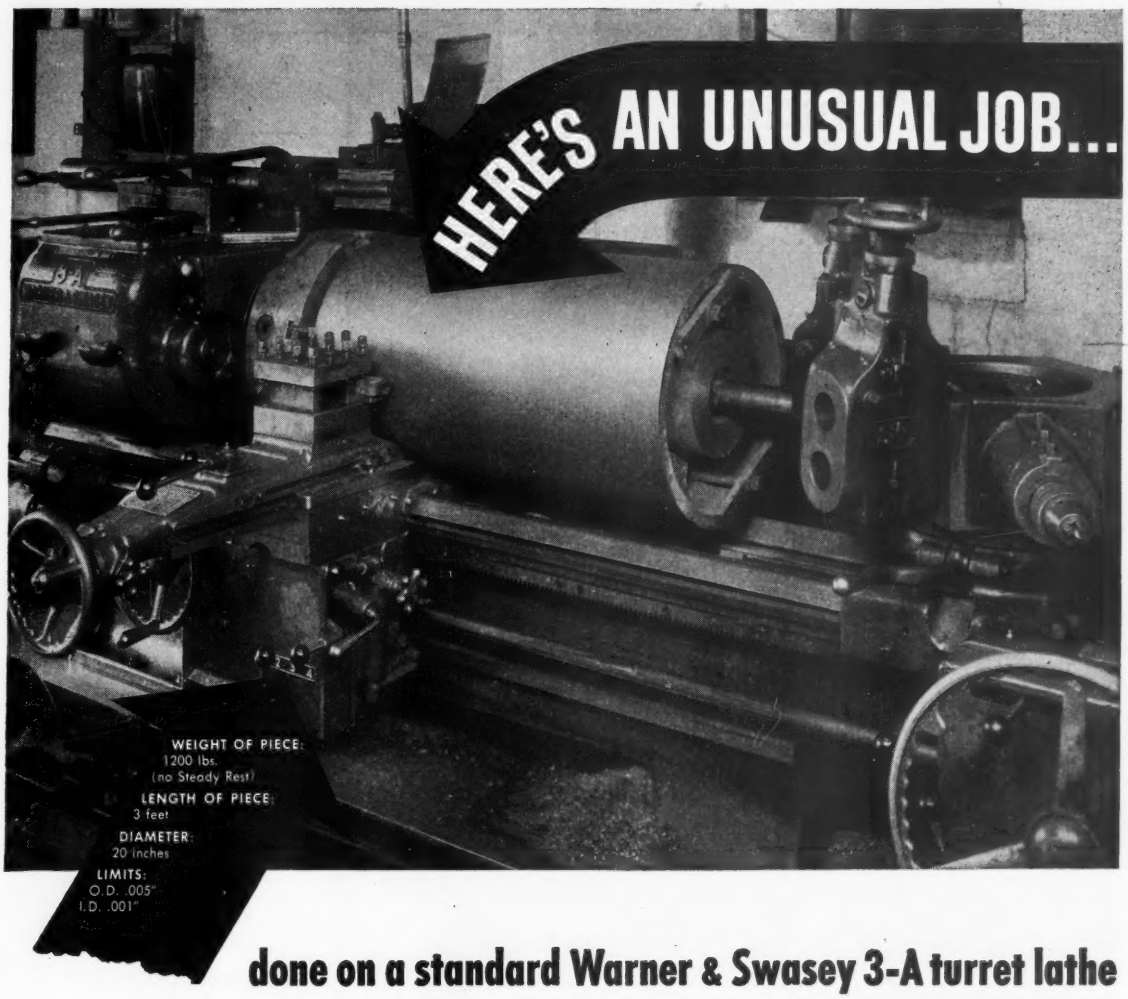
PIONEER OF A BETTER WAY IN PLATING



done on a standard Warner & Swasey 3-A turret lathe

THE HALEY MACHINE COMPANY of Springfield, Ohio, contracts to produce massive coal-crusher rolls.

These dense cast iron rolls weigh 1200 pounds each. They are 36″ long and 20″ in diameter. The two hub bores, 6″ and 9″ long, must be finished to .001″, and the O.D. to .005″. All diameters must be held concentric within .005″.

The roll was gripped internally and machined *with no steady rest*—held securely by the 3-jaw scroll chuck and two light tie rods. Two chuckings were needed, one for each end.

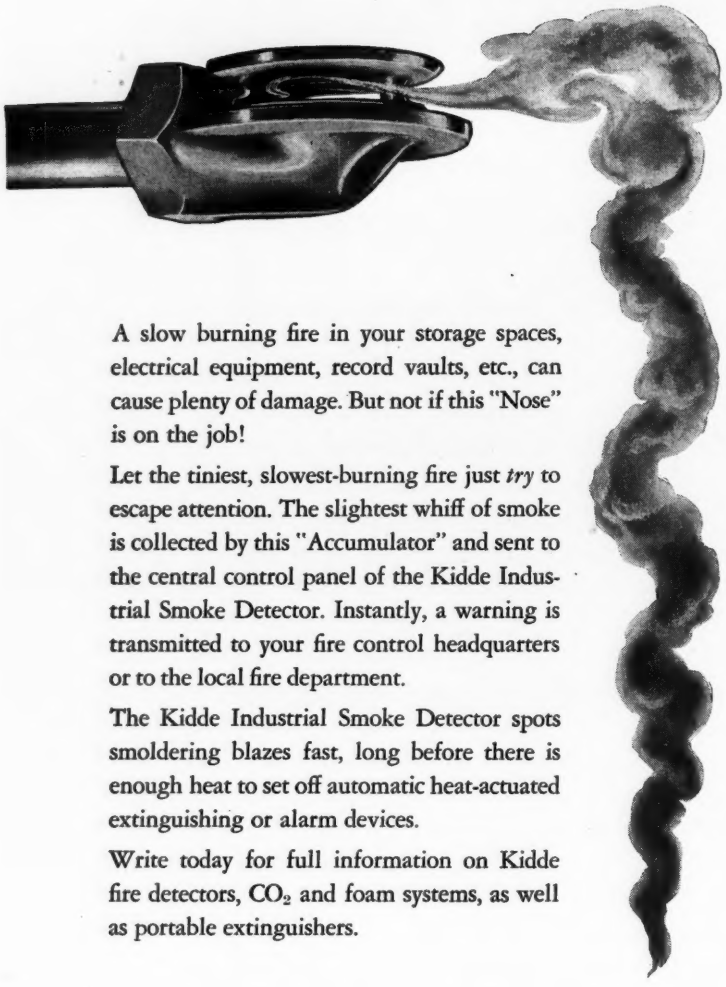
All limits were held, with an excellent finish obtained. The surprisingly fine results have assured Haley production men that this job can be done profitably on a Warner & Swasey Turret Lathe.

The size and weight of this job, demanding smooth finish and unusually close limits, clearly shows the extreme rigidity and accuracy built into each Warner & Swasey Turret Lathe. Why not find out how this rigidity and accuracy can help you solve your turning problems? Call your nearest Warney & Swasey Field Representative or write...

WARNER & SWASEY
Cleveland

YOU CAN MACHINE IT BETTER, FASTER, FOR LESS WITH WARNER & SWASEY TURRET LATHES, AUTOMATICS, AND TAPPING MACHINES

fire can't hide from this "Nose"



A slow burning fire in your storage spaces, electrical equipment, record vaults, etc., can cause plenty of damage. But not if this "Nose" is on the job!

Let the tiniest, slowest-burning fire just *try* to escape attention. The slightest whiff of smoke is collected by this "Accumulator" and sent to the central control panel of the Kidde Industrial Smoke Detector. Instantly, a warning is transmitted to your fire control headquarters or to the local fire department.

The Kidde Industrial Smoke Detector spots smoldering blazes fast, long before there is enough heat to set off automatic heat-actuated extinguishing or alarm devices.

Write today for full information on Kidde fire detectors, CO_2 and foam systems, as well as portable extinguishers.

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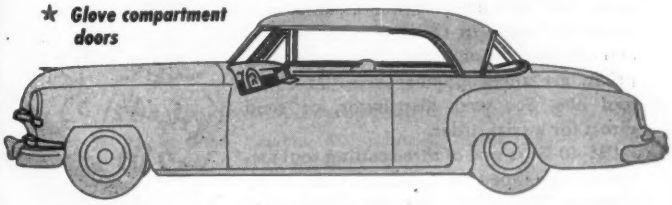
Yes . . 35 years of metal finishing experience has built a reputation for Motor Products which is recognized by the entire automotive world.

During these years Motor Products Corporation in forming individual metal parts has employed its great experience to combine the ultimate in beauty and utility.

In addition to the automotive parts identified below, Motor Products Corporation manufactures heavy rolled sections and miscellaneous parts for trucks and structural sections for steel buildings.

★ *Windshield mouldings* ★ *Window ventilators* ★ *Garnish mouldings*

★ *Glove compartment doors*



★ *Radiator grilles* ★ *Instrument panels* ★ *Body mouldings*

MOTOR PRODUCTS CORPORATION

Detroit 11, Michigan

HEAVIER CUTS IN HARDER MATERIALS AT HIGHER SPEEDS

Get More Production with GORHAM "M-40-B" Tool Bits!

Get more out of your machine tools . . . raise your production curve . . . with Gorham "M-40-B" turning tools! Use "M-40-B" wherever the application of a Super High Speed Steel is indicated, as in machining heat treated alloy steels with large amounts of stock removal at high surface speeds.

"M-40-B" is a Super Moly grade with performance characteristics comparable to those of super tungsten high speed steel. It has extremely high red hardness, high Rockwell hardness, and offers maximum toughness and abrasion resistance. You can take heavy roughing cuts with it at high surface speeds and feeds . . . use it for high speed finish cuts as well.

"M-40-B" comes in square tool bits, 11 stock sizes, and in 23 stock sizes of rectangular turning tools. Bits and turning tools are accurately ground, uniformly hardened, ready to sharpen. Special sizes and shapes to your order. Illustrated with prices are three popular size "M-40-B" tool bits. See your distributor, or send direct for a trial order.

"M-40-B" is one of three cutting tool materials developed by Gorham. Others are Gorham "Standard", for the commercial field, and "Gormet", for turning soft or abrasive stock. They're completely described, with size and price lists, in a new free bulletin. Send for your copy today.

Gorham TOOL COMPANY

"EVERYTHING IN STANDARD AND SPECIAL CUTTING TOOLS"

14401 WOODROW WILSON • DETROIT 3, MICHIGAN

WEST COAST WAREHOUSE: 576 North Prairie Ave., Hawthorne, Calif.

LETTERS
TO THE EDITORS

The Lurking Danger

I appreciate receiving regularly your editorials. After reading them, I hand them to others who give thought to such more serious issues as you stress.

It seems to me that our country now has two major issues. One is the policy of trying, as a nation, to spend ourselves into prosperity. What a disenchantment there will be some day! The other is the hunger of highly placed public officials for more and more power.

The attempt to grab the steel industry, important as it is, looks like a mere symbol of something else that lurks in the background—encroachment of government into business life. The time to halt such designs is as soon as possible. The job is one that the American people will have to do. This definitely is not an issue between the steel industry and the people representing the labor industry. It is one of preventing complete government domination of both Industry and Labor.

J. A. Danielson
J. A. Danielson Co.
Richmond, Calif.

Glad to Help

I have been receiving STEEL here at OPS for the past several months. Reading STEEL each week has given me a lot of information and background material which has been helpful in handling my assignment in the Industrial Materials & Manufactured Goods Division.

Lester Scott
Office of Price Stabilization
Washington

Cheese Mit Manganese

In *Deutsche Molkereizeitung* I found a short abstract of a paper published in your magazine, titled "Does Manganese Shorten the Time of Cheese Ripening?" As I worked also on this problem, I should be very much interested to see the original article.

Prof. Dr. Karl Demeter
Freising bei Munchen
U. S. Zone, Germany

• *Our Production Engineering News at a Glance item, "Manganiferous Cheddar," merely reported that research along these lines had been undertaken. For more information write the Washington State Institute of Technology, Pullman, Washington, where the research is going on.*

FLAT SPRING STEEL

You can get it now! . . . and we believe it's the best spring steel we've ever made

OUR NEW specialty spring steel plant is in full swing. Equipped with today's most modern, precision machines, we believe we're producing flat spring steel that gives more for your money than ever before.

This new spring steel is tops in uniformity. It saves you preparation time . . . cuts down machine stoppages . . . gives you the greatest number of perfect parts from every foot and pound of steel.

With our greatly increased capacity we can make prompt deliveries on flat spring steel. And if you need high carbon round or shaped wire, ask what we can do. John A. Roebling's Sons Company, Trenton 2, N. J.

ROEBLING

ATLANTA, 934 AVON AVE • BOSTON, 51 SLEEPER ST • CHICAGO, 5525 W. ROOSEVELT RD • CINCINNATI, 3268 FREDONIA AVE • CLEVELAND, 701 ST. CLAIR AVE, N. E • DENVER, 4801 JACKSON ST • DETROIT, 915 FISHER BLDG • HOUSTON, 6216 NAVIGATION BLVD • LOS ANGELES, 5340 E. HARBOR ST • NEW YORK, 19 RECTOR ST • ODESSA, TEXAS, 1920 E. 2ND ST • PHILADELPHIA, 230 VINE ST • SAN FRANCISCO, 1740 17TH ST • SEATTLE, 900 1ST AVE S. • TULSA, 321 N. CHEYENNE ST • EXPORT SALES OFFICE, TRENTON 2, N. J.

"Yessir . . . every cutting tool in

THE MORSE LINE

. . . is handled by our MORSE.

He Knows How to Cut Costs for Us with MORSE ELECTROLIZED TOOLS"

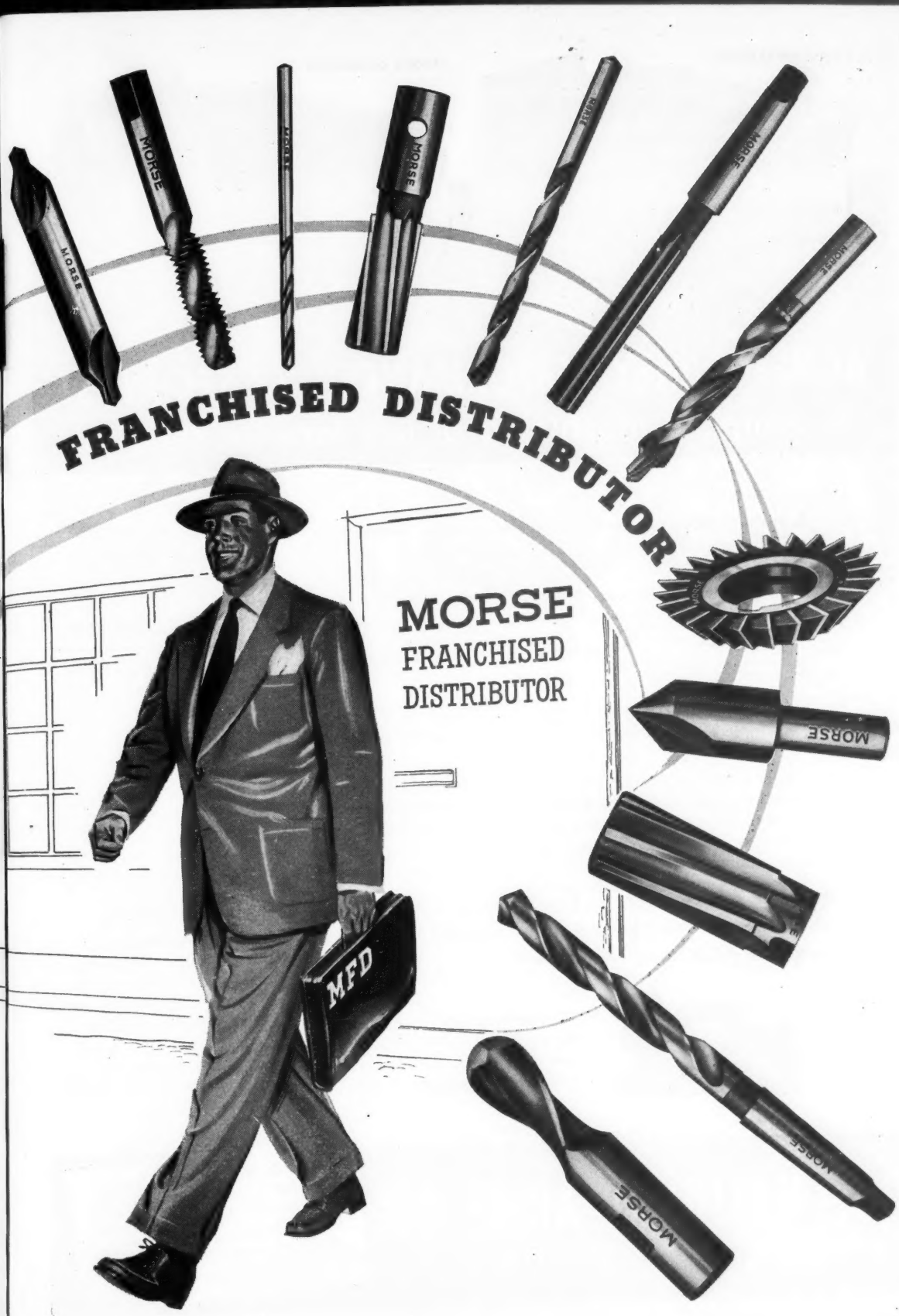
Here's the quickest way to cut production costs: Order the best cutting tools you can buy . . . Morse High Speed Tools, correctly specified for the job in hand. Then specify "MORSE ELECTROLIZED" . . . and you'll get many times more the wear-life than you ever got from *any* tools on that job before . . . as scores of leading metal-working plants have done, in the last 3 years.

Get in touch today with your Morse-Franchised Distributor . . . your *only* source of supply for Morse Electrolized Tools. He has the stock and the know-how to help you start cashing in *right now,* on real savings in production costs.

MORSE TWIST DRILL & MACHINE COMPANY
NEW BEDFORD, MASS.
(Div. of VAN NORMAN CO.)
Warehouses in New York, Chicago, Detroit, Houston, San Francisco

MORSE
Cutting Tools

. . . buy them by phone from your Morse-Franchised Distributor and save ordering time


FRANCHISED DISTRIBUTOR
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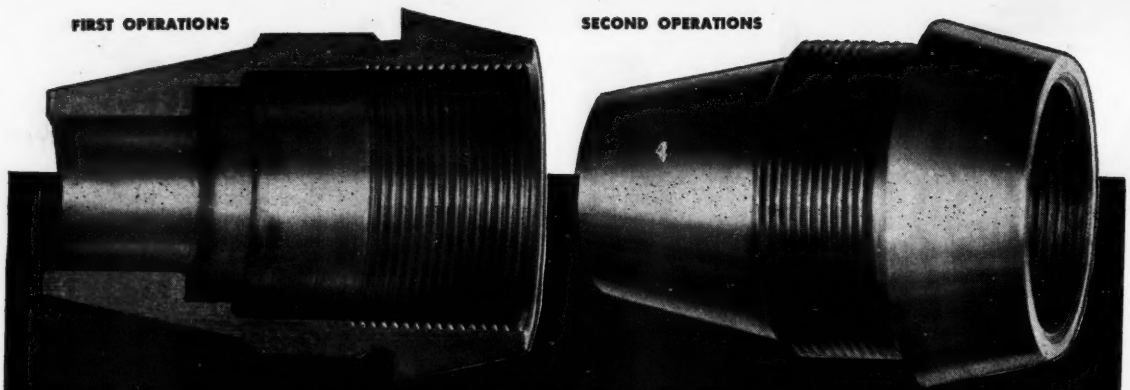


ACME-GRIDLEY PERFORMANCE...*73 SECONDS!*

for complete machining of this familiar steel job

1. The first 15 operations are done on a 3½" six spindle Acme-Gridley Bar Automatic in ..... **57 SECONDS**

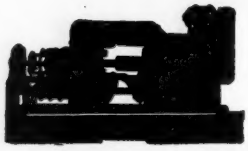
2. The secondary operations are done on a double indexing 8" eight spindle Acme-Gridley Chucking Machine (2 per cycle) at the rate of ..... **16 SECONDS**

Total multiple spindle machine time..... 73 SECONDS

A 2 1/16" Namco Collapsible Tap and a 3½" five chaser Vers-O-Tool, both with ground thread chasers, cut the smooth 12 NF class 2 threads.

Here is another outstanding example of the economies that result from studied tool engineering co-ordinated with time-proved machine design—a combination for which The National Acme Company is justly famous. *Again we say:*

No other source offers a line so complete—so much design and tooling experience in multiple and single spindle bar and chucking automatics—more than 45,000 machines built.



Whether for defense or civilian production, it will pay you to ask for Acme-Gridley's production figures on the work you are doing or contemplate. Send prints or samples.

The NATIONAL ACME CO.

170 EAST 131st STREET · CLEVELAND 8, OHIO

Acme-Gridley Bar and Chucking Automatics: 1-4-6 and 8 Spindle • Hydraulic Thread Rolling Machines • Automatic Threading Dies and Taps • The Chronolog • Limit, Motor Starter and Control Station Switches • Solenoids Centrifuges • Contract Manufacturing

The bundle of sticks

A wise old man called his quarrelsome sons about him. Taking up a bundle of sticks, he commanded each in turn to break the sticks. All tried, but in vain, and said it could not be done.

"And yet, my boys, nothing is easier to do," said the father, as he undid the bundle and broke the sticks, one by one. "By this example, you can see that united you will be more than a match for your enemies; but if you quarrel and separate, your weakness will put you at the mercy of those who attack you."

The useful truth of this fable is just as timely today as it was when the Greek ex-slave Aesop told it 2,500 years ago. You, a patriot, believing in individual liberty and freedom for all, see our American way of life threatened by the menace of communism abroad and jeopardized at home by complacence, negligence, confusion and incompetence.

As a business leader in your own community, you have a particular responsibility to help unify your fellow citizens and guide their thinking and action--for the strengthening and preservation of the ideals that built America, in fact, made America the envy and goal of the very individuals now seeking to destroy it. *In Union there is Strength.*

YOUR SCRAP IS NEEDED — YOUNGSTOWN

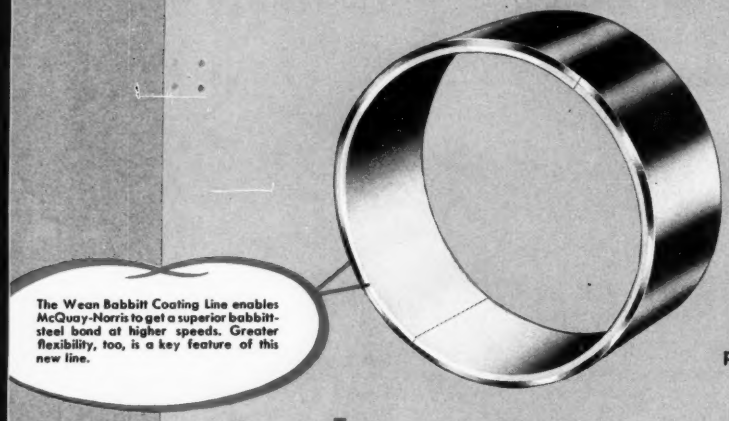
The Youngstown Sheet and Tube Company

General Offices--Youngstown 1, Ohio
Export Offices--500 Fifth Avenue, New York
MANUFACTURERS OF CARBON ALLOY AND YOLOY STEELS

The steel industry is using all its resources to produce more steel, but it needs your help and needs it now. Turn in your scrap, through your regular sources, at the earliest possible moment.

Problem...

GETTING FASTER, GREATER RANGE BABBITT COATING FOR MORE EFFICIENT BEARING MANUFACTURING . . . . .



The Wean Babbitt Coating Line enables McQuay-Norris to get a superior babbitt-steel bond at higher speeds. Greater flexibility, too, is a key feature of this new line.

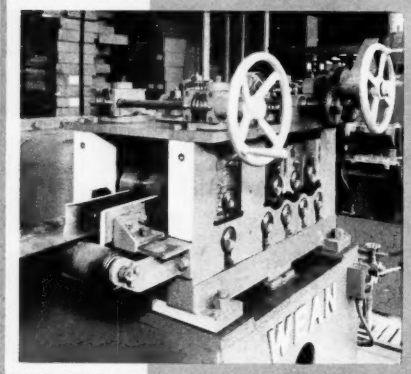
McQuay-Norris, one of the nation's leading manufacturers of bushings and bearings, found it necessary to multiply their production of babbitt coated material. They wanted a babbitt coating line that would cover a wide range of sizes at speeds that would satisfy anticipated production—a precision line that would give them a perfect bond conforming to the high quality standards of the company.

Solution...

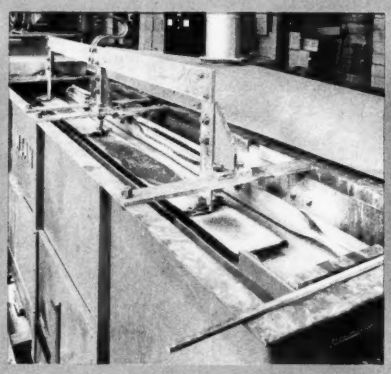
COMPLETE LINE DESIGNED AND BUILT BY WEAN EQUIPMENT DELIVERS BETTER QUALITY, WIDEST RANGE AT FASTEST SPEEDS

After thoroughly checking special machine manufacturers McQuay-Norris authorized the Wean Equipment Corporation to design and build a line that would give them the high quality, flexibility and high production speeds they demanded.

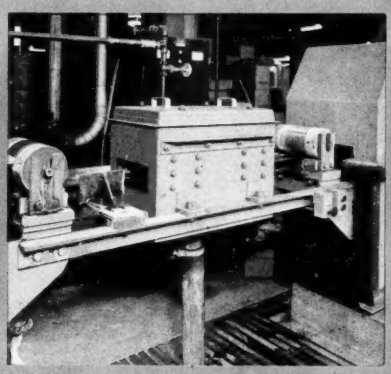
Wean Equipment engineers set to work designing the complete line from pay-off to take-up reels. The finished product is a compact, high-speed line that will process material ranging from .036" x 2½" to .125" x 7" at speeds up to 50 F.P.M.



Strip moves from 1. Leveler to...



2. Alkaline Electrolytic Cleaner to...

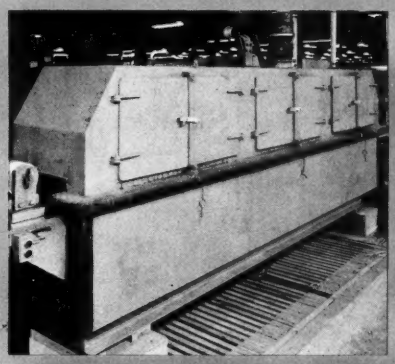


3. Fresh Water Spray Rinse to...

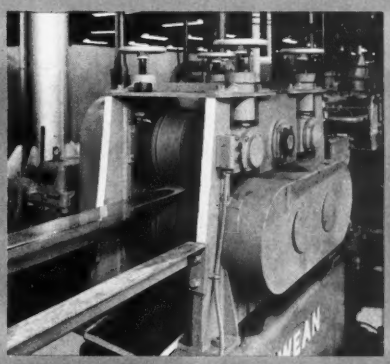
Requiring minimum floor space, the Wean line levels, cleans, pickles, tins, continuously casts a babbitt coating, precision machines to desired thickness recovering excess material and neatly coils coated material ready for fabrication.

Those who have watched the McQuay Line perform are impressed with its efficiency—the simplicity of operation and ease of maintenance. The line enables McQuay-Norris to produce bearings and bushings of precision quality at unparalleled high speeds. Changeover to different gauges, widths and coating thicknesses requires a minimum of time and labor.

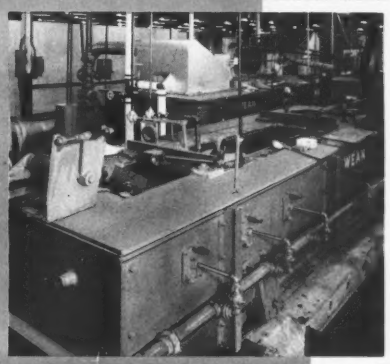
This is another example of Wean Equipment versatility and engineering skill. It is another reason why — when you're looking for the finest in special machinery, continuous lines, slitting, shearing and leveling equipment or wire machinery — you should think first of Wean — designers and builders of tomorrow's machinery today.



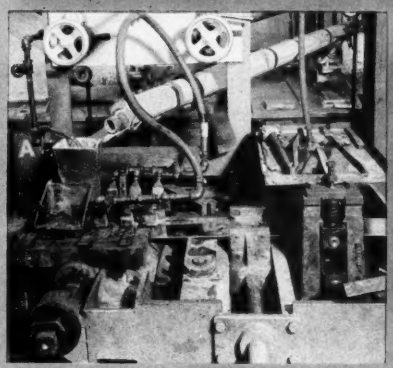
4. Electrolytic Pickle to . . .



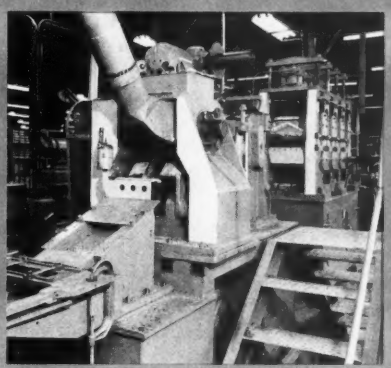
5. Intermediate Pull Rolls to . . .



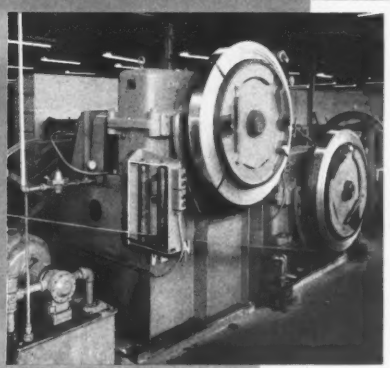
6. Tinning and Pre-heating Furnace to . . .



7. Babbitt Casting Head to . . .



8. Milling, Skiving and Main Pull Rolls to . . .



9. Double Head Recoiler.

MACHINERY TODAY IS THE BUSINESS OF THE

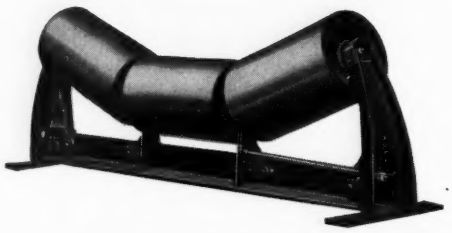
EQUIPMENT CORPORATION

Wean

Cleveland, Ohio

2 ways L-B Belt Conveyors
cost you less in the long run

1 LINK-BELT Idlers require minimum lubrication and adjustment



BY MINIMIZING maintenance . . . holding "down-time" to a new low . . . reducing power requirements—Link-Belt Roller Bearing Idlers save you money.

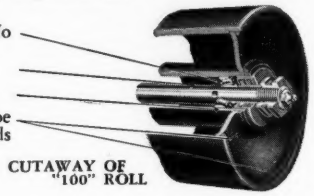
And, because of standardized design, Link-Belt gives you the famous "100" Idler or the heavy-duty "200" Idler at a cost lower than you'd expect. You can choose from the full Link-Belt line of troughing, impact-cushioning, belt training and flat belt idlers in a wide range of roll diameters and belt widths. A complete line to meet any requirement.

Grease-in, dirt-out, cartridge type unit seal preserves lubricant. No springs, no loose parts, no sliding metal-to-metal contact.

Large grease reservoir prolongs lubrication intervals.

Precision roller bearings maintain alignment.

Concentrically counterbored and journaled full-length central tube and counterbored roll shell are continuously welded to dished heads to maintain balance and bearing alignment.



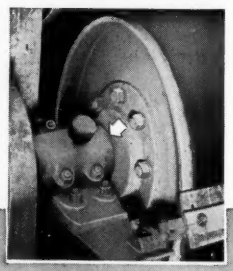
CUTAWAY OF "100" ROLL

2 LINK-BELT Welded Steel Pulleys minimize shaft deflection

MODERN Link-Belt welded steel design gives you lower maintenance and longer pulley life in more ways than one. Water- and dust-tight construction preserves balance, halts corrosion. Removable hubs — key-seated in line with two set-screws — are interchangeable with many other shaft sizes.

And for reducing shaft deflection (see below), you can't possibly get better protection than with Link-Belt Welded Steel Pulleys.

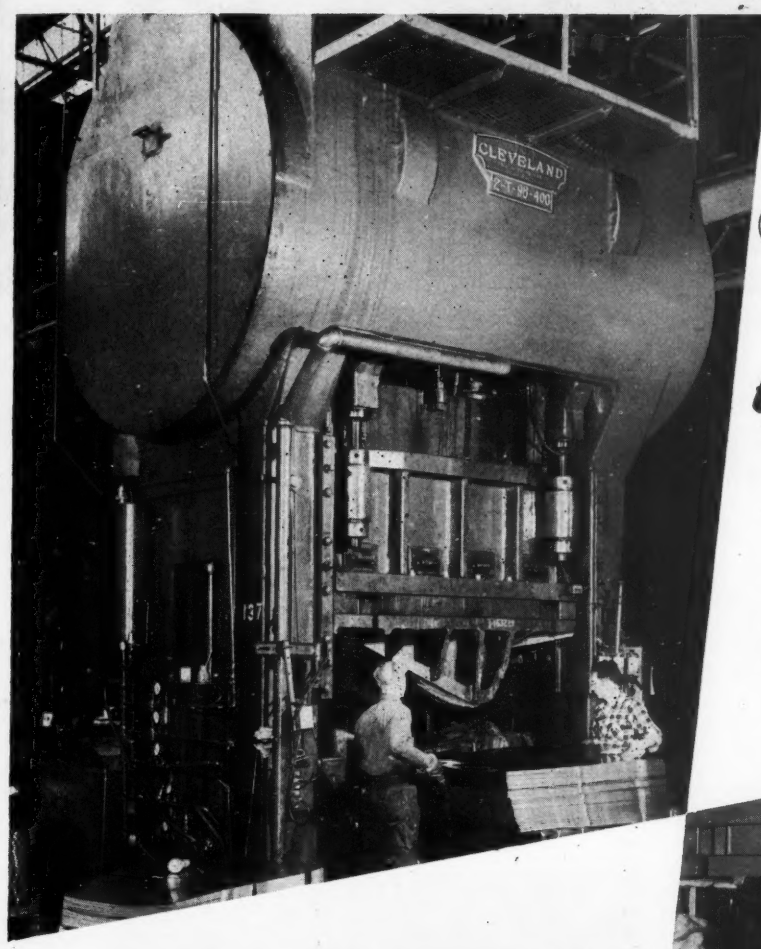
Since shaft bending moment increases in proportion to the distance between shaft bearing and pulley hub, it's easy to see why Link-Belt Welded Steel Pulleys are your best bet. Note how the bearing support and hub of the pulley are mounted with minimum clearance. That's possible because Link-Belt hubs are flush with the pulley face.



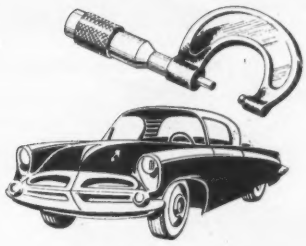
BELT CONVEYORS

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices, Factory Branch Stores and Distributors in Principal Cities. 12,533

LINK-BELT



rugged CLEVELANDS *deliver top performance*



■ Shown here, in a leading automotive plant, is a Cleveland Double Crank Double Action Toggle Press drawing a front fender skirt. The .0345 metal used is not taxing press capacity but the complicated form of the piece requires absolute slide and die accuracy to insure proper metal flow. This Cleveland was chosen for the job because past experience had proven that the rugged construction of Cleveland presses assured continuous accuracy so necessary for economical production.

Why not take advantage of the extra performance built into every Cleveland? Their massive cast frames have ample reserve capacity to absorb shock, strain and stress. Deflection and vibration are kept to a minimum. With a Cleveland you get continuous accuracy, longer die-life and economy of operation. Make your next press a Cleveland. A-6654

THE CLEVELAND PUNCH & SHEAR WORKS CO. U.S.A.

PUNCHING TOOLS & DIES

OFFICES AT:
NEW YORK . . . CHICAGO
DETROIT . . . PHILADELPHIA
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Established 1880

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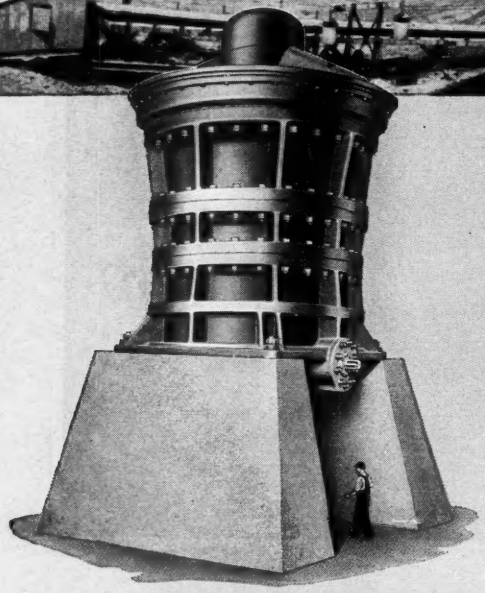
FABRICATING TOOLS

CLEVELAND 14, OHIO



WORLD'S LARGEST CRUSHERS are two 3500-tph, 60-109 *Superior* gyratories being built for Mesabi's first commercial taconite plant. Ultimate plant output will be 10 million tons.

FINES ARE SCALPED from r.o.m. ore on sturdy 1000-tph vibrating screens like this one in Minnesota. A-C builds *six* separate types of vibrating screens for beneficiation.

EQUIPMENT FOR IRON ORE BENEFICIATION: Gyratory and jaw crushers . . . Vibrating screens . . . All types of washers . . . Concentrating jigs . . . Rod, ball, and *Ballpeb* mills . . . Centrifugal pumps . . . Rotary kilns and coolers . . . *Texrope* V-belt drives . . . All types and sizes of electric motors and generators . . . Starters . . . Transformers and voltage regulators . . . Complete power generation, distribution, control equipment.

the Bottom!

As Mesabi Ores Lean Out, Allis-Chalmers Aids in Beneficiation

DIRECT SHIPPING ORES are fading fast up on the once fabulous Mesabi range. But despite foreign ore discoveries, by 1955 a quarter of blast furnace feed must be beneficiated domestic ore.

Allis-Chalmers — manufacturer of equipment for the steel industry from the mine to the mill — is helping lead the way to more economical beneficiation of lean ores.

Does low ore content require you to triple material handled? Allis-Chalmers will build you bigger, more efficient equipment! At far left below is the world's largest crusher, being built by A-C for a Mesabi taconite plant.

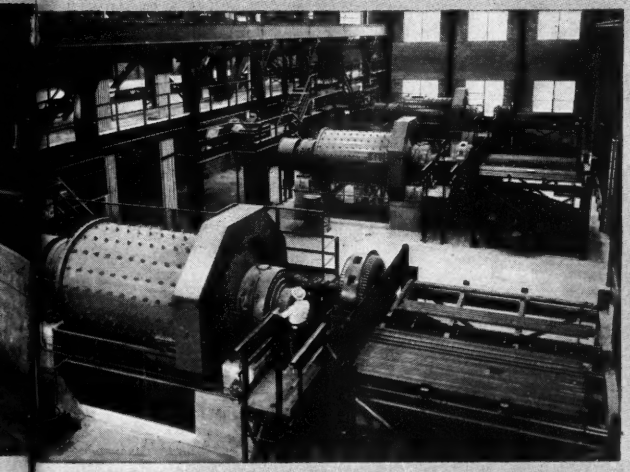
Has proper yet economical pelletizing got you stumped? Allis-Chalmers has just put into operation a pilot Pelletizing and Heat Hardening plant built exclusively for researching new pelletizing methods.

Do you have a beneficiation "shortcut" in mind? Don't let lack of equipment postpone your testing of new processes. The Allis-Chalmers Processing Research Laboratory stands ready to accurately and exhaustively test any processing method on a confidential basis.

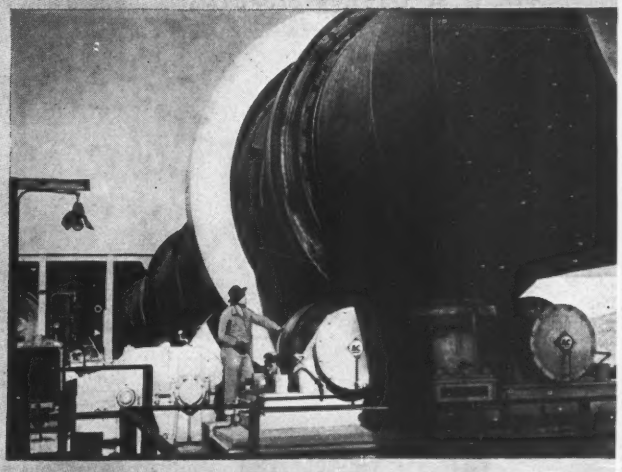
For over half a century Allis-Chalmers equipment has been processing ores for America's steel industry. Some of the cost-cutting, tonnage-increasing ore beneficiation equipment in the broad A-C line is seen on these pages.

Allis-Chalmers offers you *one-manufacturer responsibility* for process, drive and control equipment all along your flow sheet. For literature or detailed information on products and services, call your nearest A-C office or write to Allis-Chalmers, Milwaukee 1, Wisconsin. A-3808

Superior, Ballpeb and Texrope are Allis-Chalmers trademarks.



ORE IS GROUND in three rod and ball mills ahead of magnetic separation at this beneficiation plant. A-C builds *all* types of grinding mills for ore beneficiation processes.



IRON ORE IS AGGLOMERATED to make good blast furnace and open hearth feed in Allis-Chalmers rotary kilns in connection with iron mines and beneficiation plants.

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

Power, Electrical, Processing Equipment for Iron and Steel

How will that shiny new machine, appliance or equipment that you manufacture look after six months—a year—five years?

Will bolts and screws show ugly signs of rust? Will nuts corrode, so that their removal requires a hacksaw?

Harper Fastenings of non-ferrous metals and all stainless steels will solve your corrosion troubles—protect the equipment you manufacture throughout its life.

H. M. Harper is the world's largest exclusive producer of bolts, screws, nuts, rivets, studs, washers, cotter pins, of brass, naval bronze, silicon bronze, Monel, nickel, aluminum, and all stainless steels. Over 7,000 items in stock, bringing you these advantages:

All your requirements from one source

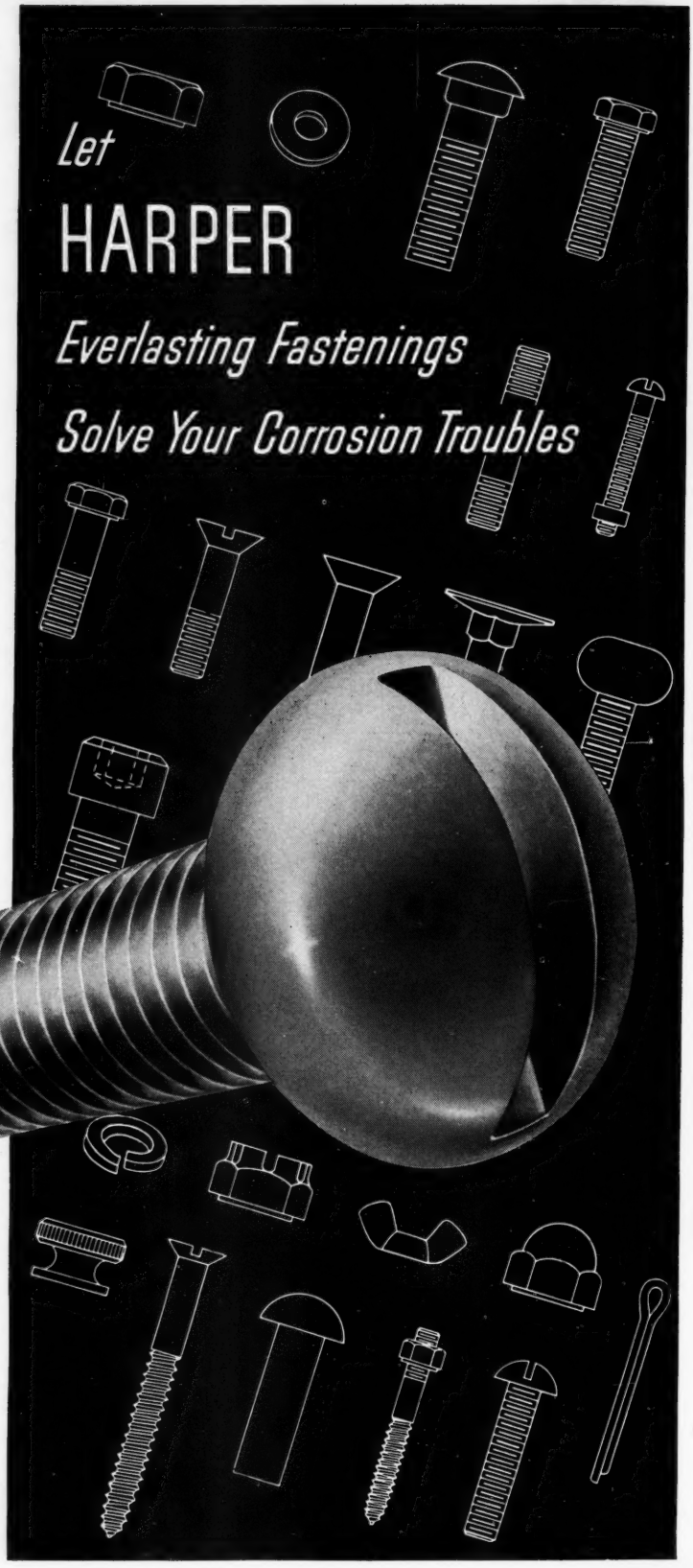
One order to write

One account to keep

One bill to pay

Harper distributors are located in every market area. Back of them is a vast reservoir of metallurgical experience and engineering skill to assist you in solving any corrosion problem.

THE H. M. HARPER COMPANY
8207 Lehigh Ave., Morton Grove, Ill.



HARPER
EVERLASTING FASTENINGS

10-32 x 1" Round Head, 18-8 Stainless Steel Machine Screw. One of 7,000 fastening items carried in stock.

Tough...flexible...decorative...

maybe it can give you ideas!

THE material you see above is braided wire. Here at National-Standard it is produced in almost limitless variations . . . flat, tubular, plain, beamed, springlike or untempered, tight or expanded, in many wire sizes, in a great many widths, and of any metal that can be drawn into wire.

At present, the most common uses are for reinforcing pneumatic tire beads, high pressure hose and other rubber products. In these applications its strength and mechanical adhesion qualities are unsurpassed.

Considering its limitless variations and unique qualities, braided wire is bound to have many other effective applications. Perhaps it can save or make money for you! An interesting possibility, for example, is its use with transparent plastics to produce pleasing patterns as well as reinforcement.

If all this gives you an idea you'd like to explore, be assured that National-Standard, as usual, is ready to cooperate with you all the way. Let's talk it over. Just get in touch with the *National-Standard Company, Niles, Michigan.*

NS
NATIONAL-STANDARD
Company
NILES, MICHIGAN

DIVISIONS OF NATIONAL-STANDARD CO.

ATHENIA STEEL	*Clifton, N. J.*	**Flat, High Carbon, Cold Rolled Spring Steel**
NATIONAL-STANDARD	*Niles, Mich.*	**Tire Wire, Stainless, Fabricated Braids and Tape**
REYNOLDS WIRE	*Dixon, Illinois*	**Industrial Wire Cloth**
WAGNER LITHO MACHINERY	*Jersey City, N. J.*	**Metal Decorating Equipment**
WORCESTER WIRE WORKS	*Worcester, Mass.*	**Round and Shaped Steel Wire, Small Sizes**

What does it take to *follow through?*

CRACK! Swung with perfect coordination, a clubhead hits a golf ball so hard it flattens it. You see in this A. G. Spalding & Bros. photo the swinging of a golf iron taken at a speed of 1/50,000 of a second.

It takes more than muscle to hit a golf ball the way you should. It takes coordination.

Ask anybody. Everybody will agree, just as everybody agrees you need coordination to run a business. Especially, we think, a steel mill.

Making steel is complicated enough anyway, and today we're trying to make the kinds and qualities of steel you want, and still fulfill military requirements and government allocations. Under somewhat trying circumstances.

That's why coordination of departments is the No. 1 Rule here at Wisconsin Steel. It's more than just something to pay lip service to. It's our way of life.

It enables us to keep on top of our commitments—to make only promises we can keep, and to follow through on any promises we make. Worth bearing in mind—next time you order steel.

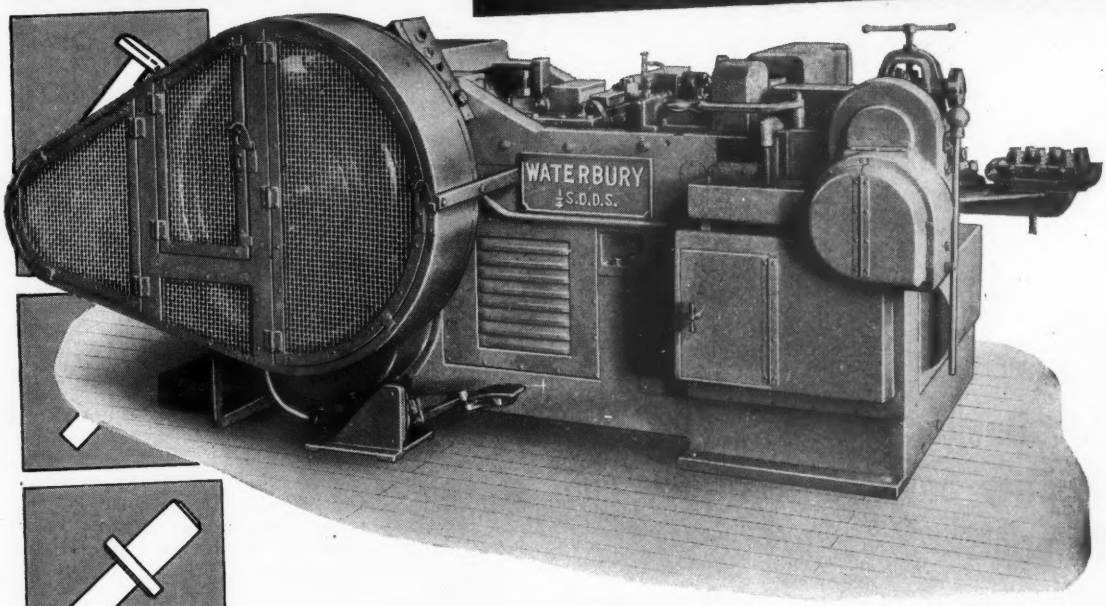
WISCONSIN STEEL COMPANY, Affiliate of INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue, Chicago 1, Illinois

INTERNATIONAL HARVESTER

WISCONSIN STEEL

The new

WATERBURY HI-PRO



¼" Capacity . . . Speed, 150 to 200 Headed Blanks per minute . . .

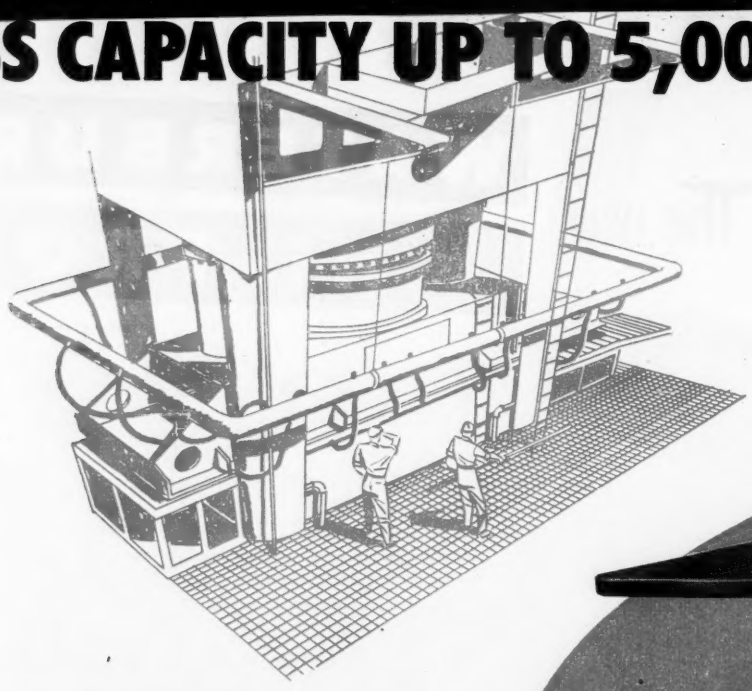
ALL STEEL, SOLID DIE, DOUBLE STROKE

Another High Speed Automatic COLD HEADER of Revolutionary Design . . . The culmination of nearly 100 years' experience and "know-how" in the design and manufacture of metal-working machinery, pioneering in the development of COLD HEADING EQUIPMENT. *Also—Bolt, Screw & Nut Machinery; Presses; Mill Machinery; Wire Drawing and various other metal-working machinery.*

For further information, address: PUBLICITY DEPT.

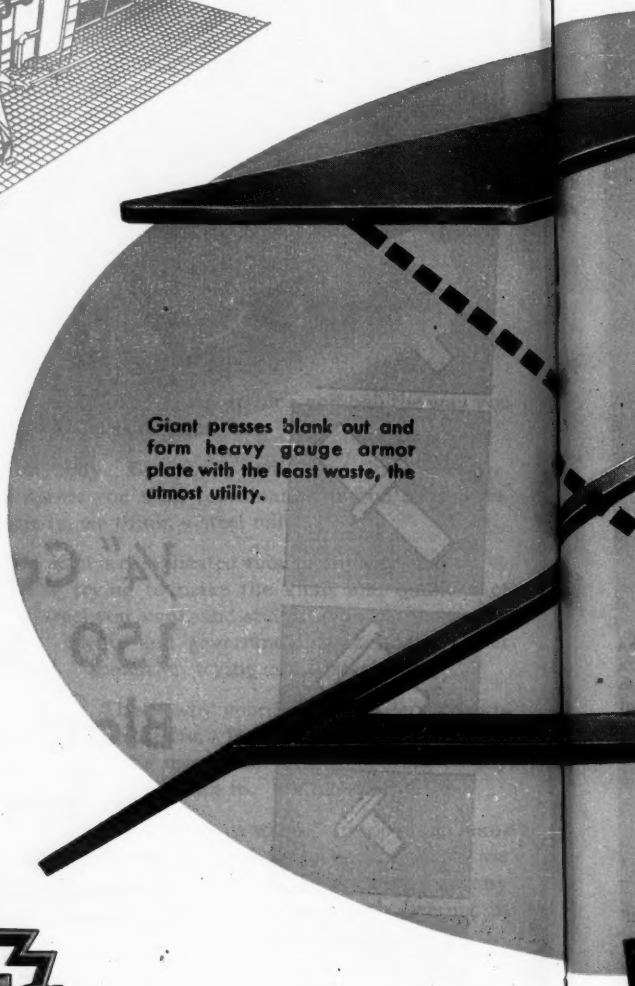
WATERBURY - FARREL
FOUNDRY AND MACHINE COMPANY
WATERBURY, CONNECTICUT, U. S. A.

PRESS CAPACITY UP TO 5,000 TONS



Our Unequalled Equipment and Facilities Save Time, Money and Materials

Whatever your needs for armor plate—whether it be large or small parts in flat or formed, fully machined shapes or even welded assemblies—you will find no facilities that can compare with our subcontracting plants. We work with our customers to properly engineer the parts, to tool for their most economical production, to expedite delivery and to carefully inspect at every phase of manufacture. For the armor plate you need in the form you need it—where you need it and when you need it, turn to Standard Steel Spring Company. Write, wire or phone us today.



Giant presses blank out and form heavy gauge armor plate with the least waste, the utmost utility.

Standard Steel Spring Company

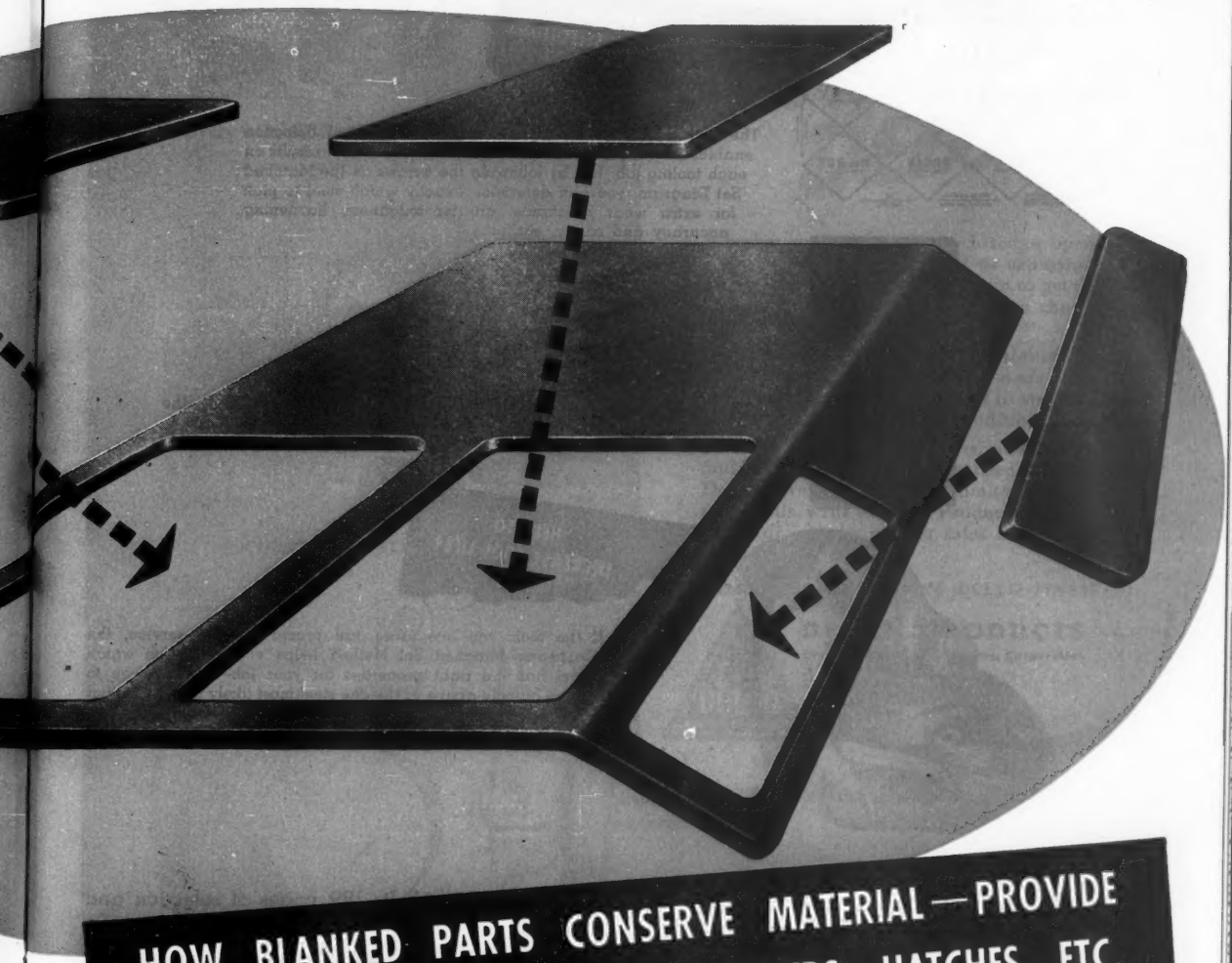
ARMOR PLATE DIVISION • PENOBSCOT BLDG. • DETROIT, MICHIGAN

EVERY FACILITY FOR PRODUCING ARMOR PLATE . . .

. . . FOR BLANKING AND FORMING

LARGE, HEAVY GAUGE

ARMOR PLATE for Ordnance



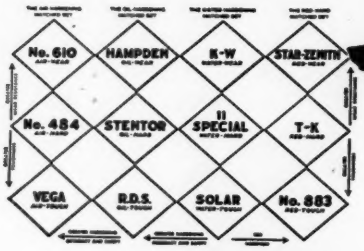
HOW BLANKED PARTS CONSERVE MATERIAL—PROVIDE MATCHING PARTS FOR DOORS, COVERS, HATCHES, ETC.

Armor plate parts can now be blanked out of sheets in a size range never before possible. The economies in this operation are obvious. In addition to speed, it is highly practical to engineer the dies so that the blanks will provide fitting doors, hatches or covers for the openings in the armor plate out of which they have been stamped.

READY TO ASSEMBLE IN GAUGES FROM ¼" TO 4" INCLUSIVE

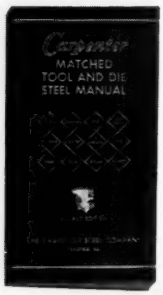
FROM TOOLMAKING TO ACTUAL PRODUCTION...

Here's Real Help that reduces costs!



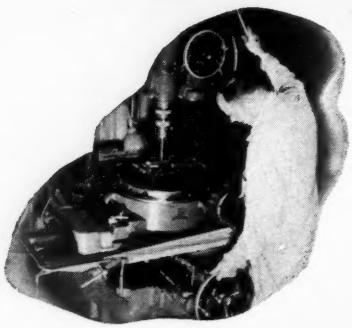
HELP IN TOOL STEEL SELECTION!

The Carpenter Matched Set Method of Tool Steel Selection enables you to quickly choose the right steel for best results on each tooling job. Just by following the arrows on the Matched Set Diagram, you can determine exactly which steel to pick for extra wear resistance, greater toughness, hardening accuracy and safety, etc.



HELP THAT SIMPLIFIES HEAT TREATING!

To further insure your results, complete information on the properties and behavior of each tool steel is yours—along with detailed, easy-to-use heat treating instructions.



HELP TO INCREASE TOOL LIFE!

If the tools you are using fail prematurely in service, the Carpenter Matched Set Method helps you determine which steel has the right properties for your job—enables you to more quickly arrive at the one steel most likely to boost output per grind and reduce tool failures.

And you get many more advantages when you use the Carpenter Matched Set Method. With far fewer steels to "work with," inventories are reduced and chances of tool steel "mix-ups" are fewer. Put this cost-reducing program to work in your plant, now. Ask for your copy of the new Carpenter Matched Tool Steel Manual. Its 189 pages of selection and heat treating data are your starting point for real savings. Just contact your Carpenter representative.

THE CARPENTER STEEL CO., 139 WEST BERN ST., READING, PA.

Carpenter

MATCHED TOOL & DIE STEELS

Export Department: Carpenter Steel Co., Port Washington, N.Y.—"CARSTEELCO"

For your convenience, Carpenter carries warehouse stocks in principal cities throughout the country

DELCO
DAYTON OHIO
OPEN BALL-BEARING MOTOR
TOTALLY ENCLOSED, NOT FAN COOLED MOTOR
EXPLOSION-PROOF MOTOR
TOTALLY ENCLOSED, FAN COOLED MOTOR
SALES OFFICES: ATLANTA • CHICAGO • CINCINNATI • CLEVELAND • DALLAS
DETROIT • HARTFORD • PHILADELPHIA • SAN FRANCISCO • ST. LOUIS

Whatever the job you're right with a

DELCO!

Whether you need totally enclosed or open-end motors . . . fan cooled or explosion-resistant motors . . . you're certain to get the right motors on the job when you choose Delco.

Each and every Delco motor is designed and built for the job it has to do. It's *made* of the finest materials, and *engineered* to stand up longer under the roughest conditions.

So check up on Delco motors, now. You'll find Delco has the motors you need, and that Delco always meets its commitments. For full details, write to Delco Products, Dayton, Ohio, or call the nearest sales office listed below.

DELCO FEATURES MAKE DELCO FINEST

DELCO PRODUCTS
Division of General Motors Corporation
Dayton, Ohio

You can replace seamless tubing or pipe with our

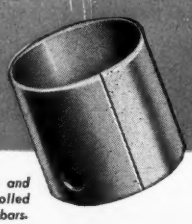
ROLLED STEEL SPACER TUBES OR BUSHINGS

and

save money in machining • material • labor

PROMPT DELIVERY

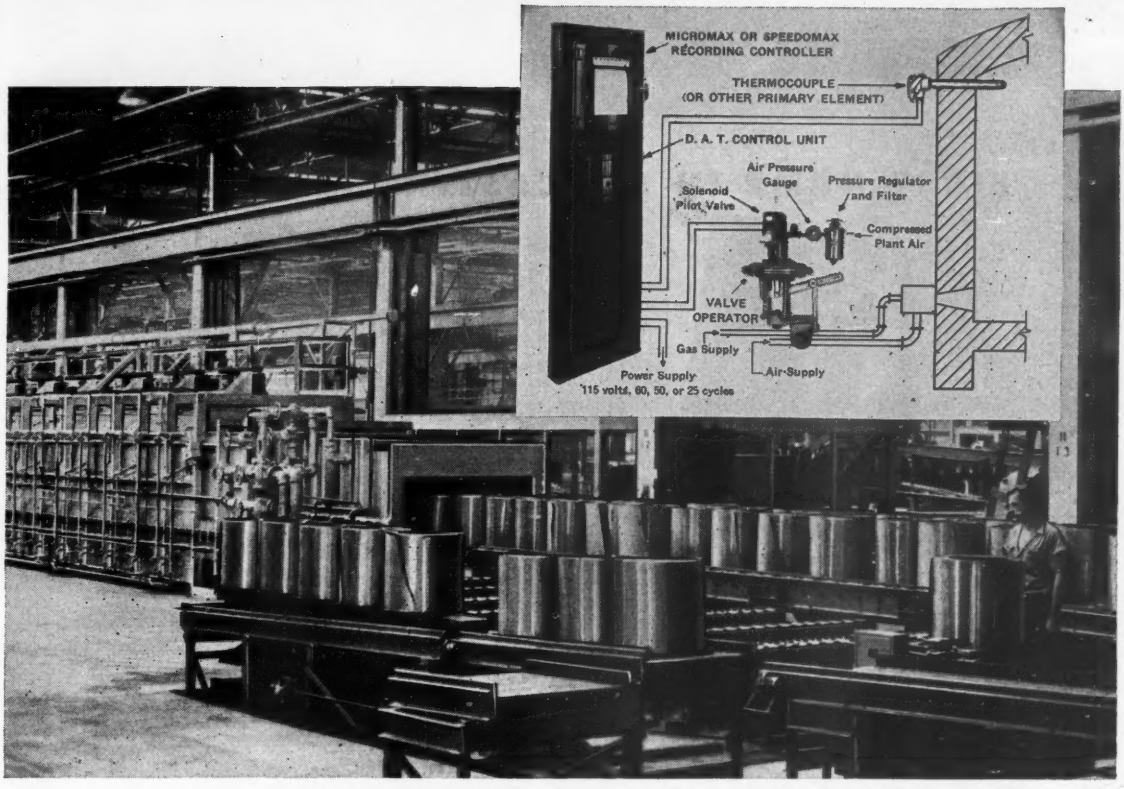
FEDERAL-MOGUL



FEDERAL Mogul Since 1899

Products of our six plants include; Sleeve bearings in all designs and sizes; cast bronze bushings; rolled split-type bushings; bimetallic rolled bushings; washers; spacer tubes; precision bronze parts and bronze bars.

FEDERAL-MOGUL CORPORATION • 11051 SHOEMAKER • DETROIT 13, MICHIGAN



THIS "package" OF CONTROL FITS ITSELF TO FURNACE NEEDS

. . . and only L&N can supply all its features!

• Scovill Manufacturing Company credits pyrometric control of their 119-foot annealing furnaces with a big part in helping to produce the most uniform, high-quality brass they've ever made. Each furnace anneals sheet in 2000 lb. coils and has a capacity of 32,500 lbs. per hour. The four furnaces were built by Surface Combustion Co. and The Electric Furnace Co. for Scovill's 10 million dollar continuous strip mill.

Scovill's success in controlling temperatures is timely because it shows what can be done with thousands of other industrial furnaces. Small units may need only one instrument, instead of Scovill's five per furnace.

But the principle is the same.

Instead of arbitrarily turning fuel "on" at a predetermined low temperature, and "off" at a predetermined high, D.A.T. alternately turns heat on and off—flexibly adapting the periods of on-time to the needs of the furnace. When temperature begins to rise above the set-point, the periods of on-time become shorter. When temperature falls, periods of on-time grow longer. In this way, D.A.T. exactly adapts its action to the upsets, load changes and lags of the furnace. This means it holds temperature in line for all normal changes in furnace charge, ambient temperature, temperature control point, etc.

Increased production resulting from unusual uniformity is the great advantage of D.A.T. but other points are worth remembering:

Fuel can often be saved because less heat is lost up the stack.

Valve and burner sizes are not particularly critical.

D.A.T. can often modernize an old furnace, because it's so easy to install.

D.A.T. operates equally well on furnaces of full-muffle, semi-muffle, open firing and conventional radiant-tube design.

D.A.T. is just one of several L&N Controls. Call us for service or information in selecting equipment for any temperature-control problem. Address nearest office or 4957 Stenton Ave., Philadelphia 44, Penna.

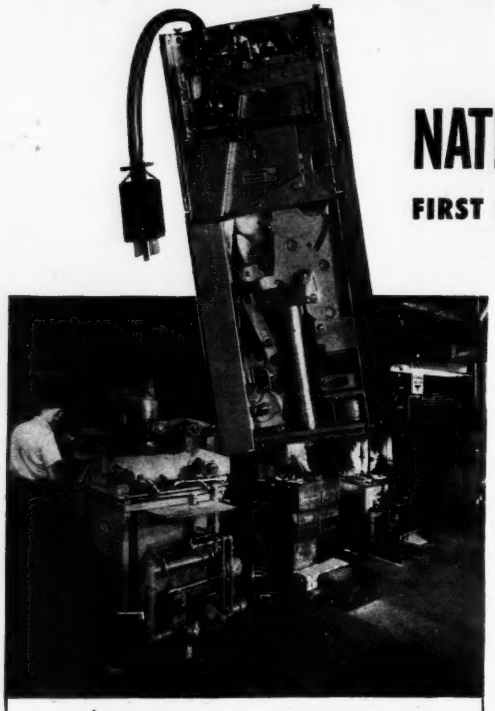
LEEDS & NORTHRUP

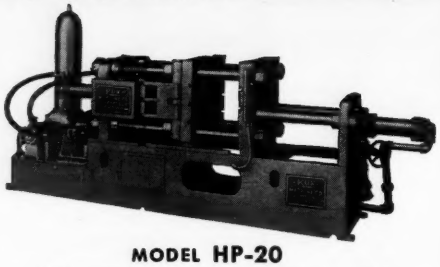
instruments • automatic controls • furnaces

Jrl. Ad N-33A-626(7)

KUX

FIRST NAME IN DIE CASTING MACHINES





MODEL HP-20
Hydraulically operated die casting machine for production of aluminum castings.

USED BY

NATIONAL REJECTORS, INC.

FIRST NAME IN COIN CONTROL DEVICES

The desire for a soft drink or a candy bar, . . . a vending machine and a coin. They're the ingredients it takes to make "magic with a nickel!" Right before your eyes, a miracle of miracles takes place. The proper change is returned plus the refreshment . . . all due to a remarkable behind-the-scenes mechanism made by NATIONAL REJECTORS, INC.

Using KUX die casting machines, NATIONAL REJECTORS, INC. turns out thousands upon thousands of intricate, extremely sensitive coin control devices that automatically check the coin for authenticity, return the exact change . . . and please your appetite!

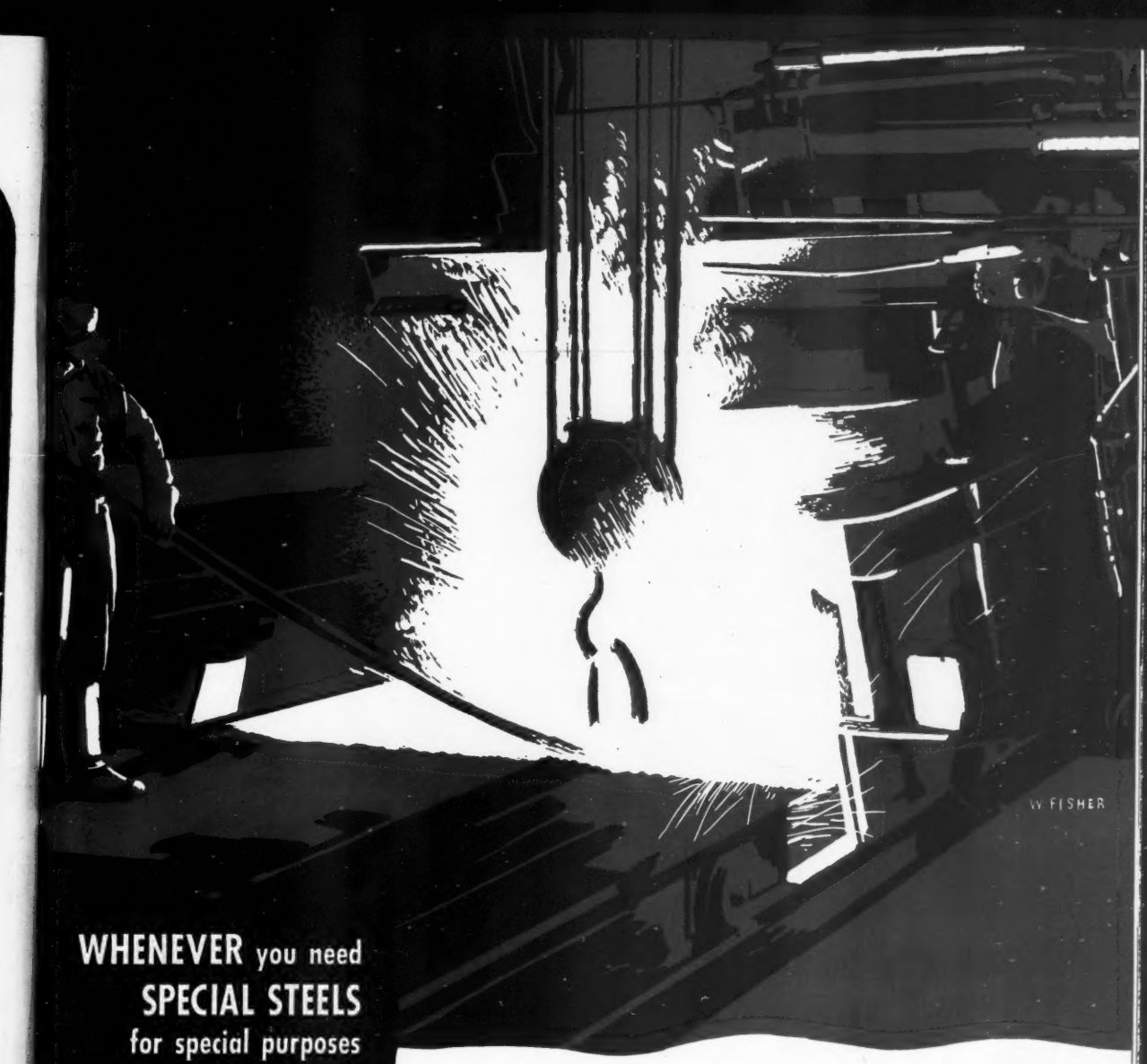
Does YOUR PRODUCT require pin-point accuracy? Quality die castings often provide the difference between success and failure . . . profits and losses. KUX, first name in die casting machines, can make that difference for YOU!

Write for illustrated catalog showing complete line of KUX Die Casting Machines.

KUX MACHINE COMPANY
6725 N. RIDGE • CHICAGO 26, ILLINOIS

KUX

FIRST NAME IN DIE CASTING MACHINES
SELECTED BY FIRST NAMES IN INDUSTRY



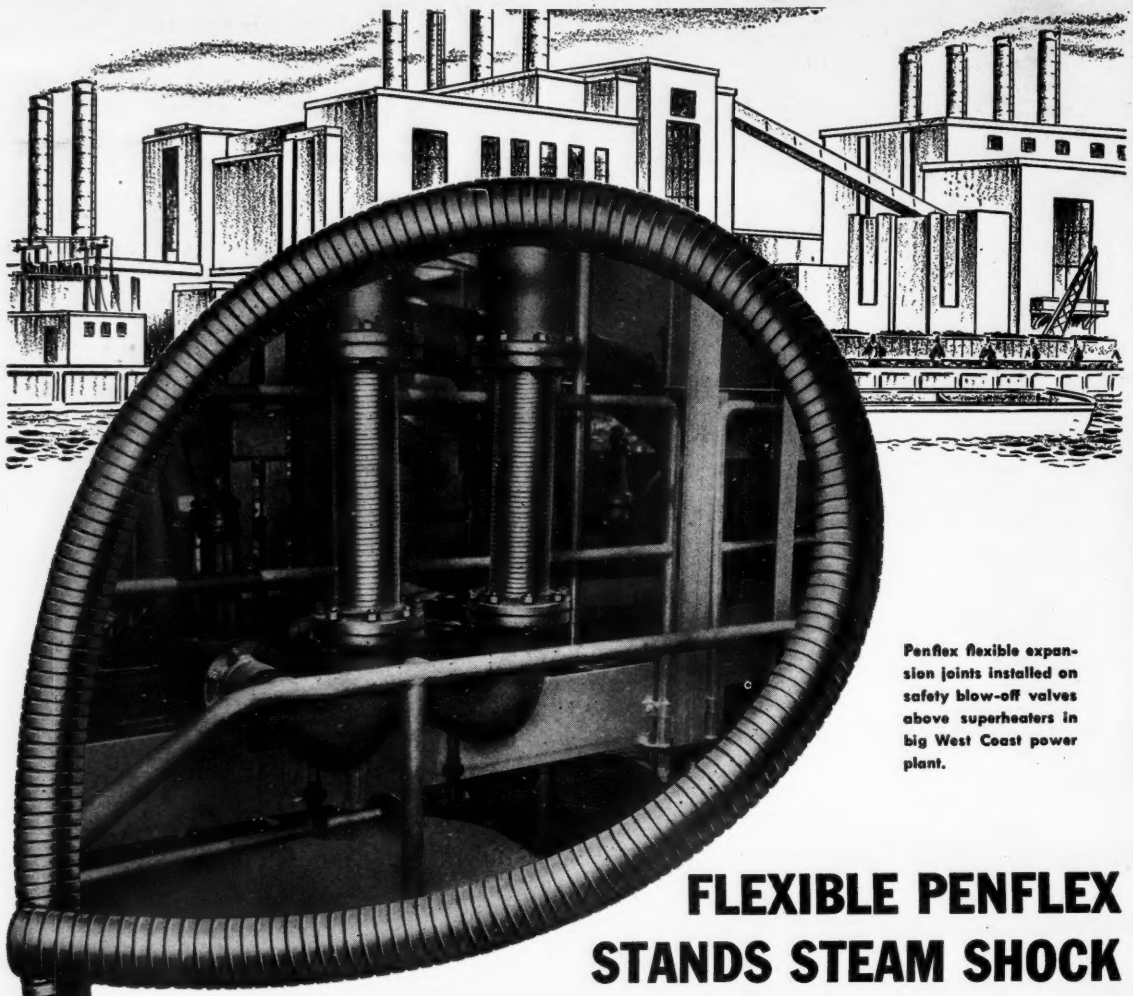
WHENEVER you need
SPECIAL STEELS
for special purposes
check first with
Ingersoll

• carbon electric steel for tank clutch discs • alloy steels • armor plate • clutch plate steels • tillage steels • soft center steel • shovel steels • knife steels • saw steels, including high speed hack saw blade steels • Tem-Cross steel • heat-resisting steels • stainless steels • IngAclad stainless-clad steel

ENGINEERING
B-W
PRODUCTION

Ingersoll STEEL DIVISION

Borg-Warner Corporation • NEW CASTLE, INDIANA



Penflex flexible expansion joints installed on safety blow-off valves above superheaters in big West Coast power plant.

FLEXIBLE PENFLEX STANDS STEAM SHOCK

PENFLEX TUBING ABSORBS THERMAL EXPANSION . . . PREVENTS BLOW-OUT

Without warning, the safety valves atop these big superheaters suddenly pop. A mighty surge of 900 F, eight-hundred-and-fifty-pound steam blasts through the pipes to exhaust to atmosphere. These pipes have to know how to take it!

Ordinary rigid pipe would blow apart under the terrific thermal expansion. But Penflex flexible metal tubing has enough "give" to take the shock. Six lengths of 8" Penflex interlocked tubing installed as expansion joints on the boiler blow-off line cushion the sudden impact . . . take up any pipe movement due to extreme temperature and pressure changes.

Penflex engineers can help you solve your tough tubing problems. Penflex makes a complete line of 4-wall interlocked and seamless welded corrugated tubing . . . metallic hose, tubing and couplings from ⅛" I.D. up . . . automatic barrel fillers, pneumatic rivet passers, accessories and fittings. Write for illustrated folder "Flexineering." It's a valuable production aid.

Pennsylvania Flexible Metallic Tubing Company, Inc., 7219 Powers Lane, Phila. 42, Pa.
Branch Sales Offices: **Boston • New York • Chicago • Houston • Cleveland • Los Angeles**

penflex

HEART OF INDUSTRY'S LIFE LINES

people profit when they specify our special steels

Companies that manufacture all types of products from band saws to twist drills and glass molds to coining dies have come to appreciate the kind of service they get at Jessop. Back of every order is a new system of *quality control* and *use analysis* designed to make sure that each steel is tailored to its exact application. If your organization employs the use of special steels, you'll find it pleasant and profitable to call on a vigorous and ambitious concern that wants your patronage on the basis of merit and is willing to go out of its way to keep it. Write to us.

HIGH SPEED STEELS • HIGH SPEED BITS • PRECISION GROUND FLAT STOCK • HIGH SPEED AND ALLOY SAW STEELS • HOT WORK DIE STEELS • COLD WORK DIE STEELS • CARBON AND ALLOY STEELS • STAINLESS AND HEAT RESISTING STEELS • VALVE STEELS • STAINLESS-CLAD STEELS • CAST-TO-SHAPE STEELS • COMPOSITE TOOL STEELS • ARMOR PLATE

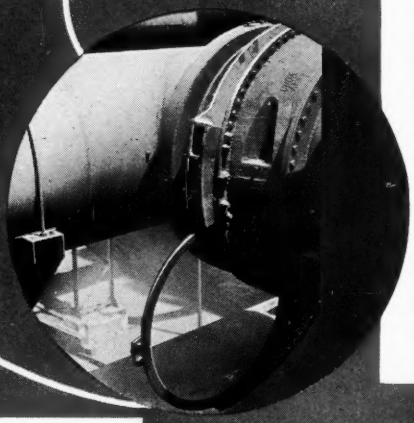
JESSOP

STEEL COMPANY · WASHINGTON, PENNSYLVANIA

Bailey GOGGLE VALVES

THERMAL

MECHANICAL



Open & Close *Instantly*

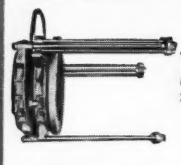
WHETHER OPERATION IS FREQUENT OR OCCASIONAL

THERMAL EXPANSION TYPE

Steam passing tnrough steel tubes causes linear expansion sufficient to free the goggle plate. When the steam is removed, normal cooling contracts the tubes, clamping the goggle plate with a gas-tight seal. In case of steam failure this type Bailey Valve can be operated mechanically.

MECHANICAL TYPE

A powerful, hand-operated clamping device assures a positive, gas-tight seal around the entire periphery of the valve. The goggle plate is released and clamped by the same powerful mechanism.



THERMAL
Made in diameters of 36" to 120"

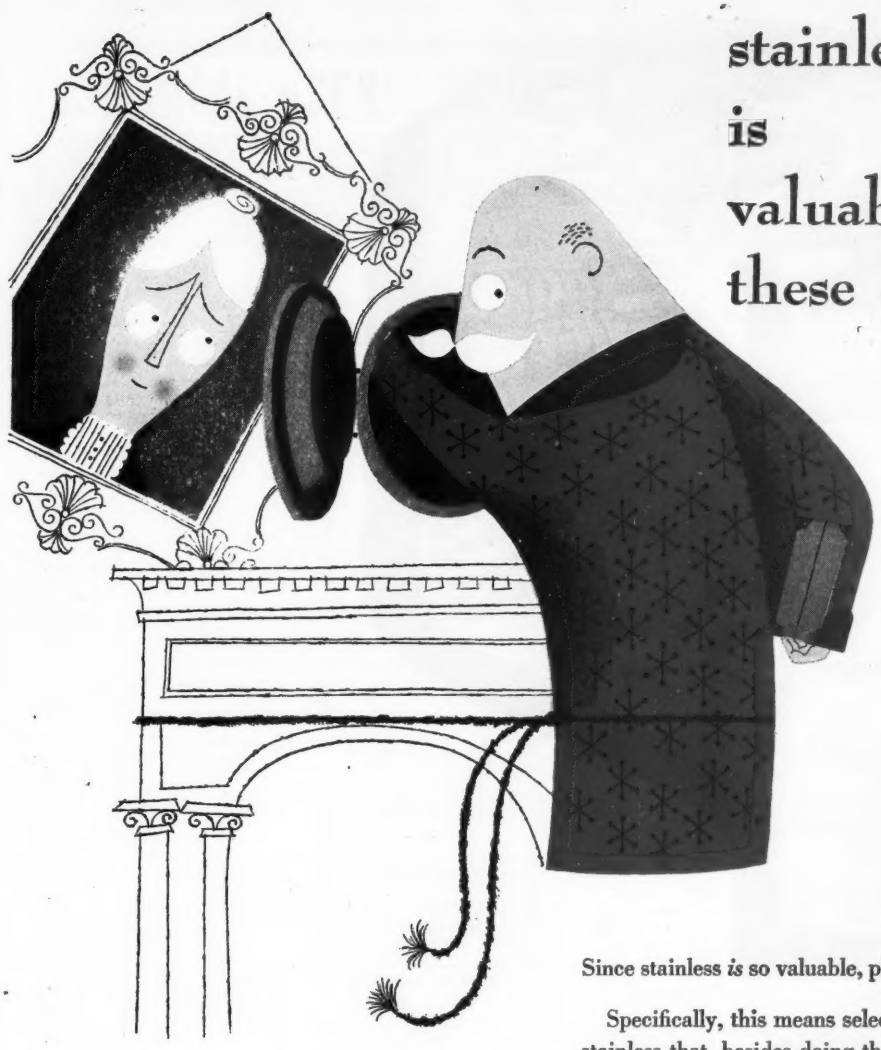
MECHANICAL
60" x 48" Bailey Valve for Horizontal Gas Main. Sizes 6" to 72"

ENCLOSED
For use near open flame a totally enclosed type is furnished

Here is the means to instant service in shutting off gas mains in emergencies or for repairs . . . regardless of the length of time the valves stand unused. Soundly designed and built of the highest quality materials, Bailey Goggle Valves have repeatedly proved themselves dependable on gas washers, blast furnace mains, precipitators and boiler plants. With their positive, gas-tight seals, Bailey valves protect men and equipment, and assure economy through long, maintenance-free service.

WILLIAM M. Bailey COMPANY
ENGINEERS
LEADERSHIP THROUGH QUALITY

1221 BANKSVILLE ROAD PITTSBURGH 16, PA



stainless is valuable these days

Since stainless *is* so valuable, plan to make it go further.

Specifically, this means selecting a grade or finish of stainless that, besides doing the job adequately, will be in less demand than one you have been figuring on.

Here is where Crucible can help you out. The matchless experience of our metallurgists and stainless fabricating specialists can help you get the most out of your share of stainless.

Call upon us to help you.

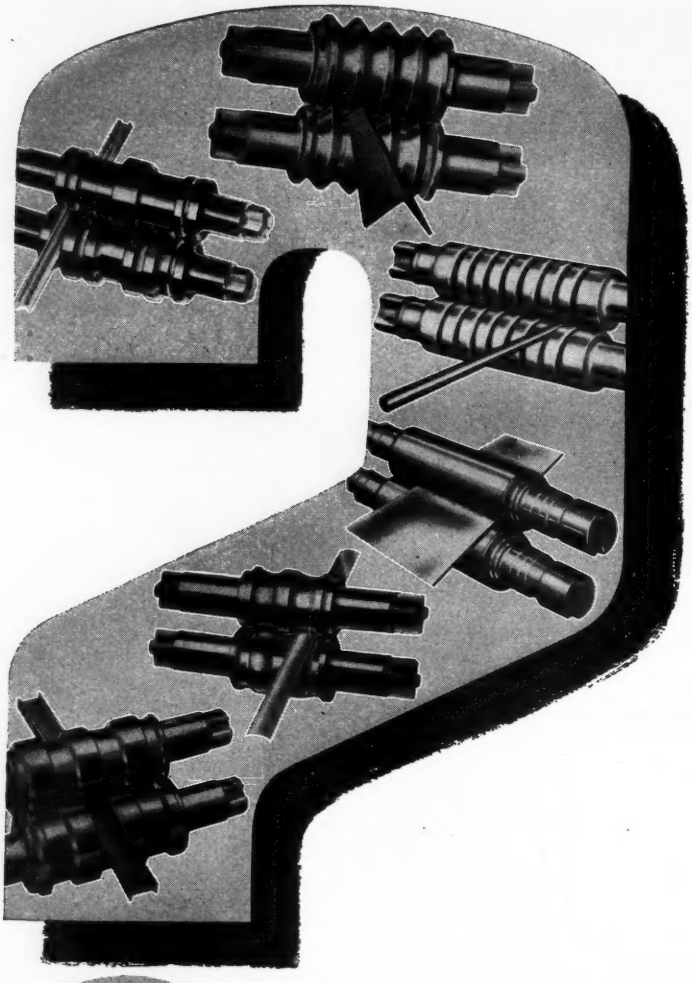
CRUCIBLE first name in special purpose steels

52 years of Fine steelmaking

STAINLESS STEEL

CRUCIBLE STEEL COMPANY OF AMERICA, GENERAL SALES OFFICES, OLIVER BUILDING, PITTSBURGH, PA.

REZISTAL STAINLESS • REX HIGH SPEED • TOOL • ALLOY • MACHINERY • SPECIAL PURPOSE STEELS



WHAT ARE *Your* ROLL REQUIREMENTS

Whatever type of rolls you require—for rolling sheet, strip and plate or forming shapes, National has the experienced metallurgical staff and the modern manufacturing facilities to produce them to your requirements.

NATIONAL ROLLS

THE NATIONAL ROLL & FOUNDRY CO.
AVONMORE, PENNSYLVANIA
Specialists in Iron and Alloy Iron Rolls

CHEMICAL USERS' GUIDE To General Chemical Products for the Metal Industries

PRODUCT	AVAILABLE FORMS	COMMERCIAL STRENGTHS	SHIPPING CONTAINERS	APPLICATIONS
Sulfuric Acid H_2SO_4	Liquid	66° Be (93.19%) 99% Oleum, 20-65%	Carboys (except Oleum) Steel Drums Tank Trucks Tank Transports Tank Cars	Pickling and descaling; electroplating; bright dipping; electrolytic polishing; galvanizing; anodizing.
Hydrochloric Acid HCl + water *(Muriatic Acid)*	Liquid	18° Be (27.92%) 20° Be (31.45%) 22° Be (35.21%)	Carboys Tank Trucks Tank Cars	Pickling; electroplating; bright dipping; galvanizing; tinning; etching metals; dissolving metals.
Nitric Acid HNO_3 + water	Liquid	36° Be (52.30%) 38° Be (56.52%) 40° Be (61.38%) 42° Be (67.18%) 95%	Carboys (except 95%) Drums Tank Cars	Pickling; electroplating; bright dipping; oxide finishing; dissolving and stripping metals.
Hydrofluoric Acid HF + water	Liquid	60% 70%	Steel Drums & Tank Cars	Pickling; electroplating; electrolytic polishing; bright dipping.
Sodium Fluoride NaF	White Powder	95% or 97% Light or Dense	Multiwall Paper Bags Fibre Drums	Manufacture of rimmed steel; heat treating; galvanizing; pickling; electroplating.
Sodium Bifluoride $NaHF_2$	White Powder	95% or 97% NaF • HF	Fibre Drums	Electroplating.
Trisodium Phosphate $Na_3PO_4 \cdot 12H_2O$ *(TSP)*	Crystal	P_2O_5—18.4%	Multiwall Paper Bags Fibre Drums	Alkali cleaning.
Sodium Metasilicate $Na_2SiO_3 \cdot 5H_2O$	White Granules	98.5%	Multiwall Paper Bags Fibre Drums	Alkali cleaning.
Oxalic Acid $C_2H_2O_4 \cdot 2H_2O$	Colorless Crystals	99.5%	Multiwall Paper Bags Fibre Drums	Oxide finishing; metal cleaning.
Potassium Fluoborate KBF_4	White Powder	97.0%	Fibre Drums	Aluminum and magnesium casting; as a flux and grain refiner for aluminum; for removing magnesium from secondary aluminum alloys.
Sodium Fluoborate $NaBF_4$	White Powder	94.0%	Fibre Drums	
Ammonium Fluoborate NH_4BF_4	White Powder	96.0%	Fibre Drums	Aluminum and magnesium casting; electroplating.
Fluoboric Acid HBF_4 + water	Liquid	42.0%	Rubber Drums	Electroplating; metal cleaning or dipping; electropolishing.
Lead Fluoborate $Pb(BF_4)_2$ + water	Liquid	51.0%	Carboys	Electroplating.
Tin Fluoborate $Sn(BF_4)_2$ + water	Liquid	47.0%	Carboys	Electroplating.
Copper Fluoborate $Cu(BF_4)_2$ + water	Liquid	45.0%	Carboys	Electroplating.
Iron Fluoborate $Fe(BF_4)_2$ + water	Liquid	45.0%	Carboys	Electroplating.
Nickel Fluoborate $Ni(BF_4)_2$ + water	Liquid	42%	Carboys	Electroplating.

The products advertised are commercial chemicals having various uses, some of which may be covered by patents, and the user must accept full responsibility for compliance therewith.

BASIC CHEMICALS

FOR AMERICAN INDUSTRY

OTHER PRODUCTS: Acetic Acid; Ammonium Thiosulfate Solution; Aqua Ammonia; Barium Fluoride; Chromium Fluoride; Copper Fluoride; Copper Sulfate; Glauber's Salt; Iron Sulfide; Nickel Fluoride; Perchloric Acid; Sodium Bisulfite, Anhydrous; Sodium Silicate; Sodium Sulfite, Anhydrous; Stannous Chloride; Tetrasodium Pyrophosphate; Phosphoric Acid; Sodium Tripolyphosphate.

GENERAL CHEMICAL DIVISION

ALLIED CHEMICAL & DYE CORPORATION

40 Rector Street, New York 6, N. Y.

Offices: Albany • Atlanta • Baltimore • Birmingham • Boston • Bridgeport • Buffalo • Charlotte Chicago • Cleveland • Denver • Detroit • Greenville (Miss.) • Houston • Jacksonville • Kalamazoo Los Angeles • Minneapolis • New York • Philadelphia • Pittsburgh • Providence • St. Louis San Francisco • Seattle • Yakima (Wash.)

In Wisconsin: General Chemical Company, Inc., Milwaukee, Wis.

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For this Automobile Fan Shaft . . .

The right Republic Steel Saved

40% IN COST...

3 OPERATIONS...

3 INSPECTIONS...

AND 1 BIG HEADACHE

Here's another case where Republic Carbon-Corrected Bar Stock replaced a carburizing steel.

Before they switched to Republic Carbon-Corrected Steel Bar Stock for automobile fan shafts, Schwitzer-Cummins Company had been carburizing the steel shafts after machining. This ran up costs, created the headache of carburizing and inspecting, tempering and inspecting, cleaning and inspecting, and finally straightening warped shafts and inspecting.

The Schwitzer-Cummins metallurgist called on our Republic 3-Dimension Metallurgical team . . . the Field Metallurgist, backed up at home by the Laboratory and Mill Metallurgists. The decision was made to change over to Republic Carbon-Corrected AISI-C 1144 Bars. Now, induction hardening and inspection takes the place of the previous 8-step procedure. No warped shafts to straighten, and a better fan shaft that will last longer in your car or truck. Cost is reduced up to 40%.

The help our Republic 3-Dimension Metallurgical Service gave to Schwitzer-Cummins metallurgists is also available to you. It can help you make better products at lower cost. When shall we call?

REPUBLIC STEEL CORPORATION
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Export Department: Chrysler Building, New York 17, N. Y.

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3-DIMENSION Metallurgical Service

Republic COLD DRAWN ALLOY STEEL BARS

REPUBLIC STEEL

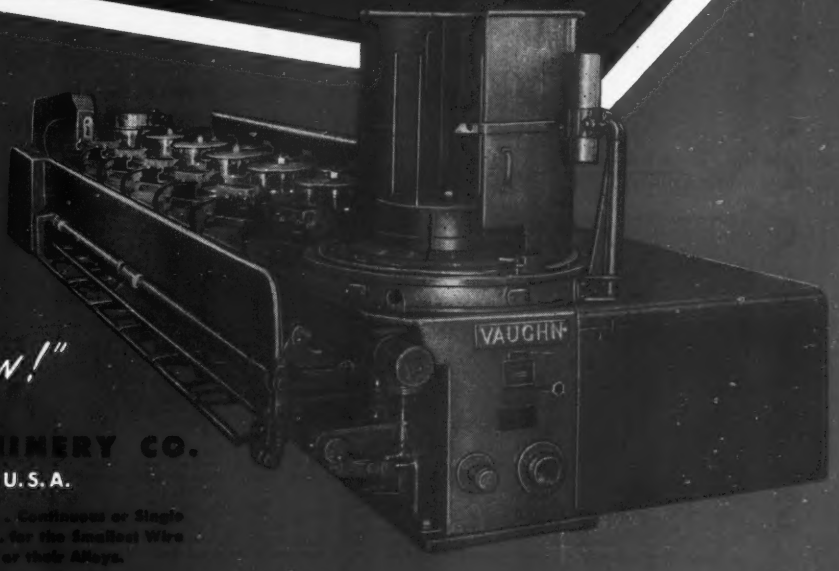
Other Republic Products include Carbon and Stainless Steels—Sheets, Strip, Plates, Pipe, Bars, Wire, Pig Iron, Bolts and Nuts, Tubing

Complete Guards for all Blocks . . .

an Electric Eye for Automatic Full Bundle Stop . . .

Now Available on all Latest Type

Vaughn® MOTOBLOX®



"Quick on the Draw!"

THE VAUGHN MACHINERY CO.

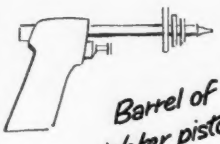
Cuyahoga Falls, Ohio, U.S.A.

COMPLETE COLD DRAWING EQUIPMENT . . . Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.

Bundyweld "Doodles"

to jog a designer's imagination

Frame of popular laundry hamper



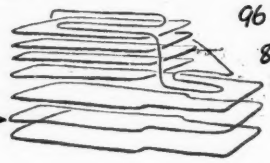
Barrel of Water pistol

Redesigning an old product? Developing a new one? With Bundyweld Tubing on the job, there's every chance for improved performance, lowered cost, smoother production, *or* some other practical plus.

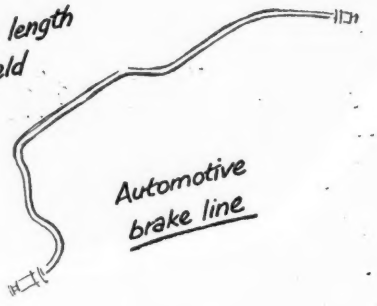
No other tubing has all the Bundyweld features. It's the only tubing double-walled from a single strip, with inside and outside beveled edges.

Too, you may profit from Bundy's famous fabrication skills. In working out tubing parts like those shown here, we may have found the answer to something baffling you. Or we can develop a new solution. Let us send you information on Bundyweld Tubing or Bundy services. ***Bundy Tubing Company, Detroit 14, Michigan.***

Coil for a Home Freezer



96 bends – 82' continuous length of Bundyweld



Automotive brake line

Bundyweld® Tubing

DOUBLE-WALLED FROM A SINGLE STRIP

Extra-strong
High fatigue limit
Leakproof
High bursting point
High thermal conductivity
Shock-resistant
Ductile
Easily machined
Takes plating
Takes plastic coating
Scale-free
Clean inside and out
No inside bead
Uniform I.D., O.D.

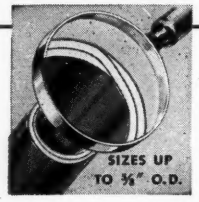
WHY BUNDYWELD IS BETTER TUBING

Bundyweld starts as a single strip of copper-coated steel. Then it's . . .

continuously rolled twice around laterally into a tube of uniform thickness, and

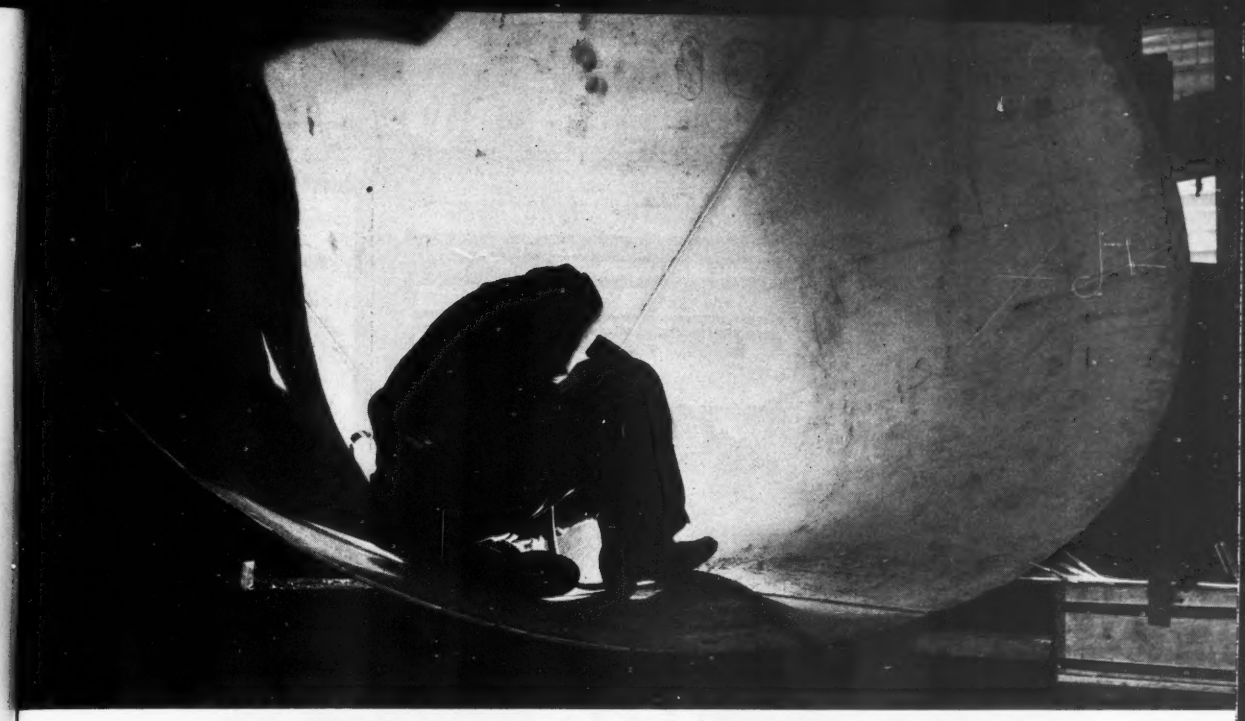
passed through a furnace. Copper coating fuses with steel. Presto . . .

Bundyweld, double-walled and brazed through 360° of wall contact.



NOTE the exclusive patented Bundyweld beveled edges, which afford a smoother joint, absence of bead and less chance for any leakage.

Bundy Tubing Distributors and Representatives: ***Cambridge, 42, Mass.:*** Austin-Hastings Co., Inc., 226 Binney St. • ***Chattanooga 2, Tenn.:*** Peirson-Deakins Co., 823-824 Chattanooga Bank Bldg. • ***Chicago 32, Ill.:*** Lapham-Hickey Co., 3333 W. 47th Place • ***Elizabeth, New Jersey:*** A. B. Murray Co., Inc., Post Office Box 476 • ***Philadelphia 3, Penn.:*** Rutan & Co., 1717 Sansom St. • ***San Francisco 10, Calif.:*** Pacific Metals Co., Ltd., 3100 19th St. • ***Seattle 4, Wash.:*** Eagle Metals Co., 4755 First Ave. South ***Toronto, Ontario, Canada:*** Alloy Metal Sales, Ltd., 181 Fleet St., E. • **Bundyweld nickel and Monel tubing is sold by distributors of nickel and nickel alloys in principal cities.**



A STABLE ARC, GOOD DIRECTIONAL CONTROL, AND WIDE USEABILITY CHARACTERISTICS ENABLE YOU TO . . .

Weld Stainless Easily in ALL Positions with G-E Stainless Steel Electrodes

36 TYPES ASSURE YOU OF THE RIGHT ELECTRODE FOR EVERY JOB

You get the most for your dollar when you buy General Electric stainless steel electrodes. Here are seven reasons why:

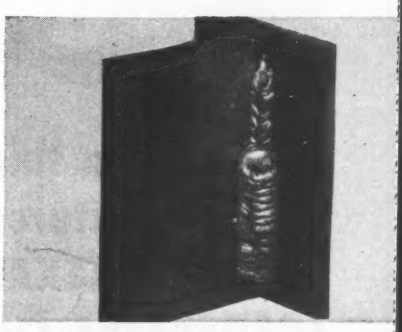
1. You get excellent handling characteristics in *all positions*.
2. You get good directional control because G-E stainless steel electrodes give you a very stable arc.
3. You get the minimum of spatter and can remove slag easily.
4. You can select the correct electrode for every application because G.E. offers industry a complete line of chrome and chrome-nickel types.
5. You can get G-E stainless steel lime-coated electrodes for reverse polarity DC and titania-coated rods for AC and reverse polarity DC.
6. You get the correct metallurgical deposit your specific job requires.
7. You get excellent physical properties in the bead itself.

See Your G-E Welding Distributor!

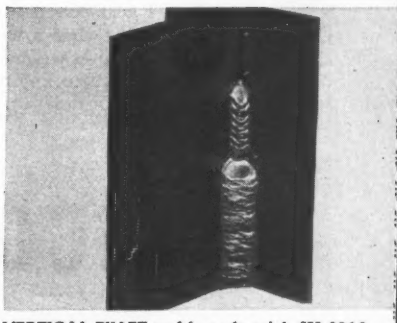
He can help you select the best, most economical electrode for your specific stainless steel welding job.

Your G-E welding distributor also carries a complete line of other electrodes, accessories, AC, DC, Inert-Arc and Atomic Hydrogen welders. You can find his name by looking for General Electric under "Welding Equipment" in the classified pages of your telephone directory. ***General Electric Co., Schenectady 5, N. Y.***

712-19

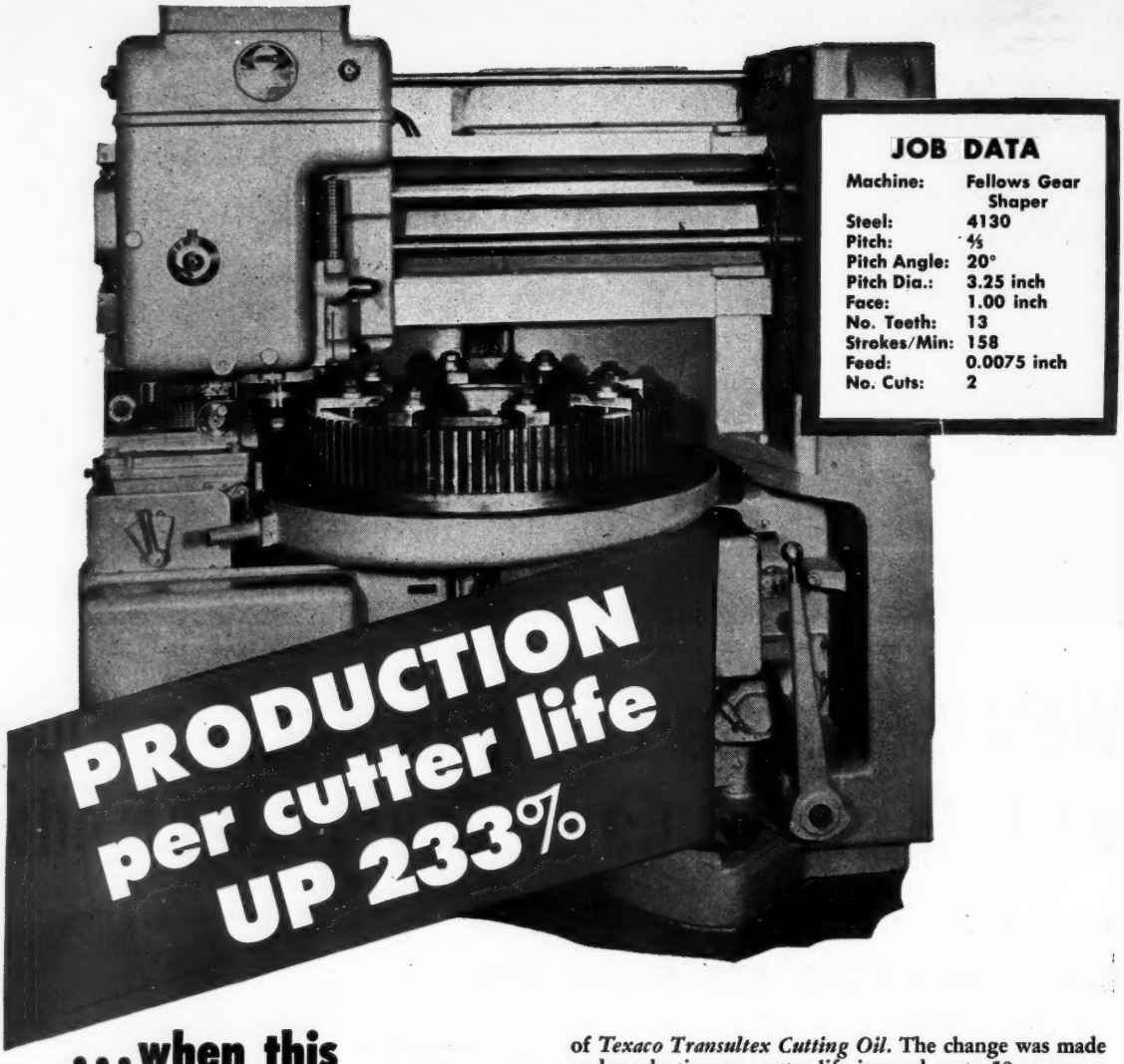


SMOOTH, NEAT WELD made with lime type W-1310, reverse polarity DC electrode.



VERTICAL FILLET weld made with W-2310, titania type, AC or DC reverse polarity.

GENERAL ELECTRIC



...when this manufacturer* changed to TEXACO TRANSULTEX CUTTING OIL

Life span of a gear cutter was never more than 15 gears—often less—when a well-known mining machinery manufacturer was using a well-known competitive cutting oil. A Texaco Engineer, called in for consultation, surveyed the entire set-up and recommended use of *Texaco Transultex Cutting Oil*. The change was made and production per cutter life jumped up to 50 gears—an increase of more than 233%.

There were other benefits, too. With *Texaco Transultex Cutting Oil*, 0.005" less stock had to be removed on tool regrinds. The transparency of *Texaco Transultex Cutting Oil* made inspection easier, reduced rejects. Cutter costs were substantially lowered.

Whatever the metal or your method of machining it, there are *Texaco Cutting, Grinding and Soluble Oils* to enable you to do every job better, faster, and at lower cost.

Let a Texaco Lubrication Engineer help you. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

*Name on request

TEXACO CUTTING, GRINDING AND SOLUBLE OILS FOR FASTER MACHINING

Faithfully yours 50 *for Fifty Years*

The Metalworking Outlook

July 14, 1952

Behind the Scenes on Steel

Watch for big steel users to meet backstage in an attempt to find a solution to the steel strike. Auto builders are particularly alarmed. They are in a relatively good position to find a compromise because they may be able to win at least tacit support from auto workers who are restive, despite the allegiance of most of them to the CIO and their on-the-surface support of the striking steelworkers. Many auto workers already have lost time this year because of production cutbacks, and now they're losing more as auto assemblies slow to a crawl.

Crimp in Shipping

The prospects for production and supply of containers and other shipping material were good, but now they're clouded by the steel strike. The outlook for cartons, other fiber containers and wooden shipping devices still appears satisfactory, not so for metal material, especially cans. Some 20 million cases of food may be lost forever in this season's crop if packers can't get metal.

Machine Tool Action

Issued probably this week will be the amendment to M-41 which will permit machine tool builders to deliver against most unrated orders . . . The proposed electrical standards on machine tools has been killed; so, the old arrangement will prevail: Electrical standards will be decided by the purchaser and builder . . . M-104, the order designed to limit machine tool finishing work, will be revoked because it doesn't contribute to conservation . . . Cancellations of machine tool defense orders in the first five months of 1952 were at the rate of 34.5 per cent of new orders received.

Opportunity

Have you complaints about the role of small business in defense? You can make yourself heard at hearings planned in 13 cities by the House Committee on Small Business. The next one will be July 17 in Minneapolis. The series will place particular emphasis on the operations of the Small Defense Plants Administration, an agency which was formed by legislation growing out of similar field hearings last year.

Power Delay

The steel strike will delay the power expansion program. Some 445 projects to cost $3.1 billion are involved that would increase U.S. power capacity by 18.3 billion kw. Most of those projects are planned for completion over the next two years. Many will be delayed two to four months.

Twice as Many Locomotives?

To achieve Defense Transport Administration goals, locomotive builders will have to more than double production over the next two years. DTA recommends that railroads increase their locomotive ownership

Production-Engineering News—p. 83 *The Market Outlook—p. 153*

by 15,500 by July 1, 1954, and by an additional 8000 units by July 1, 1956. For the past two and a half years, production has averaged 280 units a month, so the program for the next two years would require builders to produce 645 units a month, 2.3 times what they have been turning out. The 1954-1956 target would require output at a rate 14 per cent above current performances.

By November

No easing of Regulation X on credit for housing will be possible until November at the earliest. Under the Defense Production Act amendments, no change can come unless the annual rate of permanent nonfarm dwelling construction is calculated at less than 1.2 million during three consecutive months. Then, not later than the first day of the second calendar month following the three months, can relaxations begin. With July-August-September as the test period, and October skipped to let the second month roll around, the date of relaxations, if any, would be Nov. 1.

Salaries: Are They in Line?

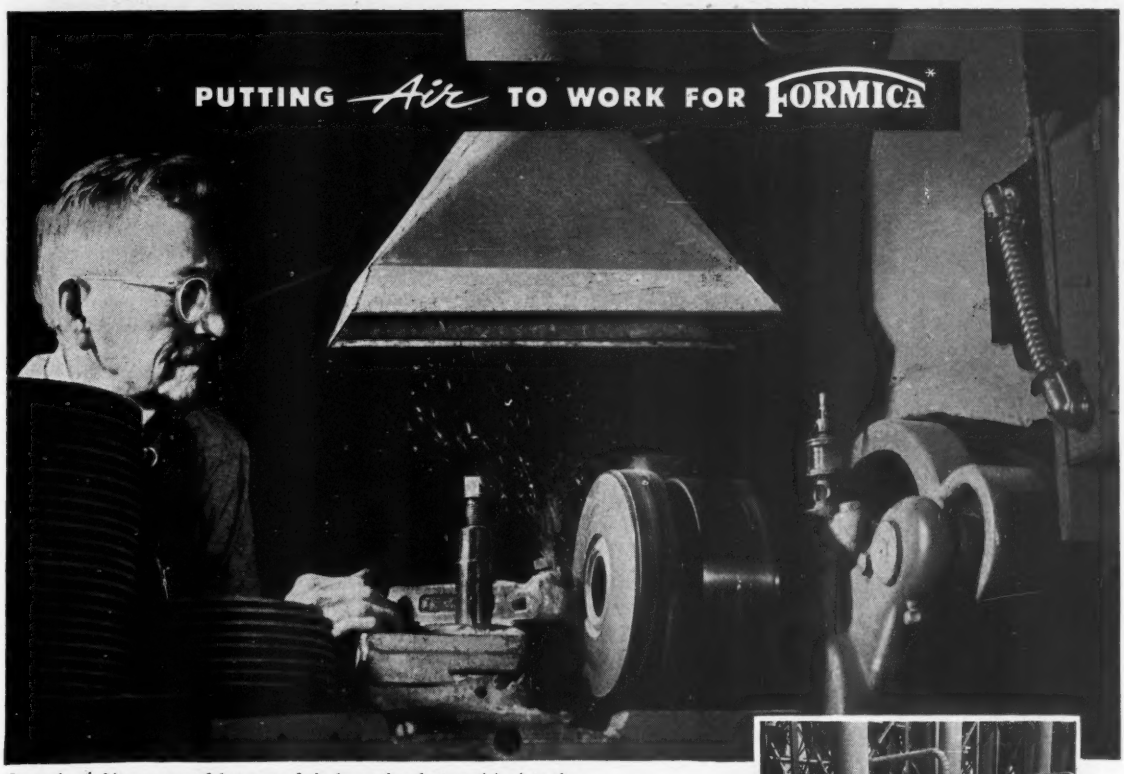
Is the salary scale of your executives in line? Because of inflation and higher income taxes, a controller who earned $15,000 in 1940 would have to earn $31,400 today to have equivalent take-home pay; a treasurer who earned $25,000 in that year would require $59,100 now, and a corporation president whose 1940 stipend was $100,000 would have to receive $451,000. From 1945 through 1950, corporate officers on the average increased their earnings by less than 16 per cent. The cost of living rose 43 per cent, reports Austin M. Fisher of the management consulting firm of Fisher, Rudge & Neblett.

Straws in the Wind

June deliveries of new freight cars totaled 6411, compared with 6857 in May and 9644 in June, 1951 . . . Alcoa has completed a five-year contract with 9500 AFL aluminum workers who get a 10 per cent pay hike and a cost-of-living escalator clause . . . May 30 business inventories stood at $70.3 billion, $200 million down from the month previous . . . Liberia wants higher royalties on the iron ore mined by Liberian Mining Co. Ltd., whose majority stockholder is Republic Steel Corp. . . . CPR 156, the tailored price regulation on structural and plate fabrication, goes into effect July 15.

What Industry Is Doing

The steel strike is costing the nation far more than any previous walkout (p. 55) . . . Total value of defense contracts outstanding reaches $50 billion, says Defense Mobilizer Steelman (p. 57) . . . Barring copper and aluminum strikes, you'll do better on allotments for those metals and worse on steel during the fourth quarter (p. 57) . . . The trend is toward more union security (p. 58) . . . The rising helicopter industry will require even more metalworking equipment when defense needs subside (p. 60) . . . Training opens the door to high quality at low cost (p. 66).



On each machine, a powerful stream of air draws tiny dust particles into the collection system before they can be dispersed and become a health or maintenance problem.

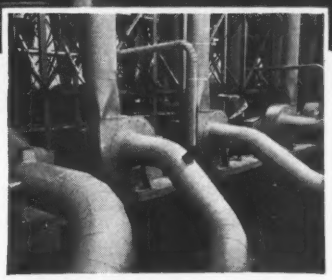
HOW TO "DUST OFF"

150 MACHINING OPERATIONS AT ONCE

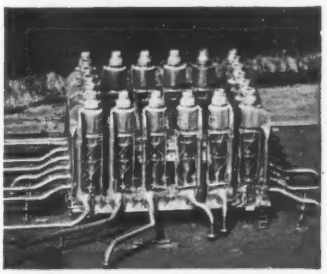
They're literally giving dust "the air" at Formica's new Cincinnati plant. With more than 150 micro-sanding and finishing machines working on decorative sheets or laminated shapes, well over 100 pounds of fine dust are created every hour. Unchecked, it would represent a hazard to worker health and efficiency as well as a costly cleaning and maintenance problem.

The answer? A dust collection system was designed and installed by Kirk & Blum using 32 powerful Westinghouse-Sturtevant fans. Through individual hoods serving each machine, 218,000 cfm of air picks up dust particles and carries them to collectors on the plant roof. Although completely exposed to the elements, expert engineering and rugged construction has given these fans the ability to "take it" and still perform at top efficiency the year 'round.

To help you *put air to work*—with air handling, air conditioning or air cleaning—Westinghouse offers a complete line of industry-proven equipment to meet your individual needs. See the new General Catalog 600, a 60-page reference file, describing the full product line and its industrial applications. To get a free copy, call your local Westinghouse-Sturtevant office, or write Westinghouse Electric Corp., Sturtevant Division, Hyde Park, Boston 36, Mass.



Carefully designed blades in these Westinghouse fans give highest operating efficiencies with lower power consumption.



A 20-collector Kirk & Blum system handles dust particles 100 microns and smaller in size with 99.5% collection efficiency.

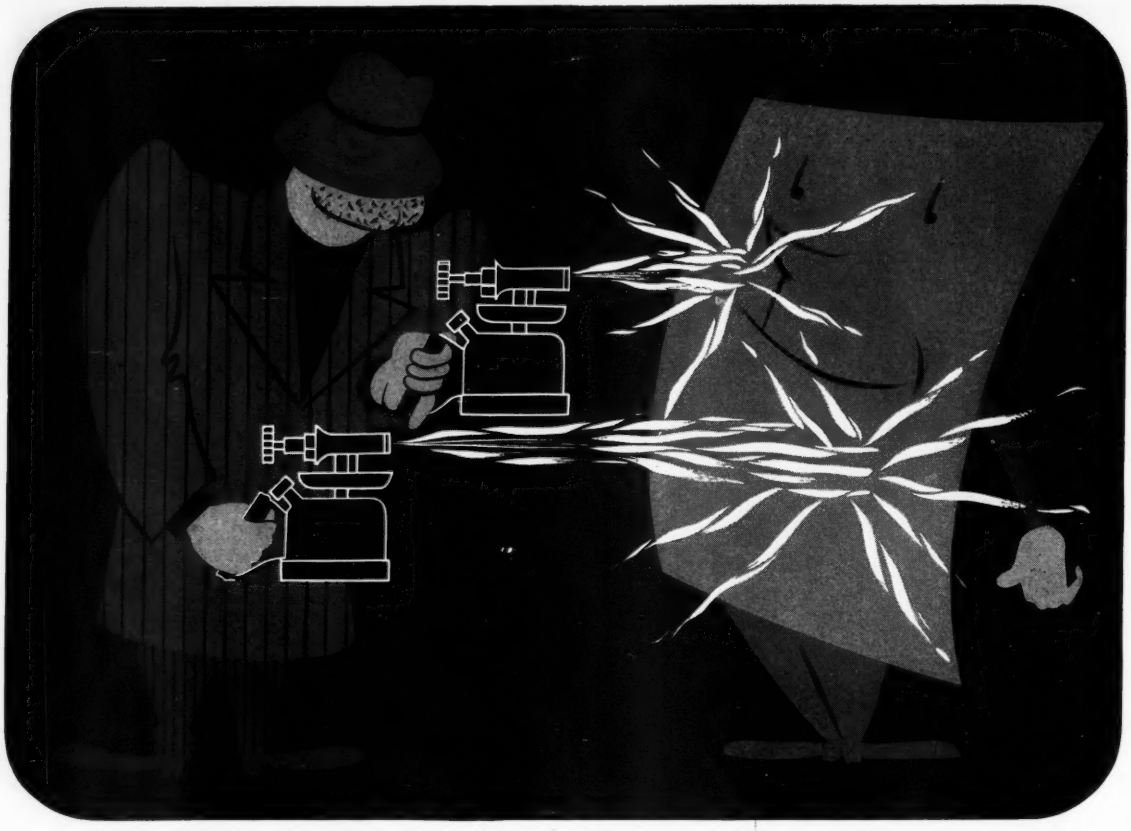
YOU CAN BE SURE...IF IT'S Westinghouse

J-80271

AIR HANDLING

TUNE IN ON HISTORY! Only Westinghouse brings you complete coverage of four-month political campaign over CBS television and radio.

*Reg. U. S. Pat. Off.



Here's a steel that gives heat the "BOUNCE-OFF"

Yes, heat *bounces off* the surface of Armco ALUMINIZED Steel. Up to 900 F., about 80% of the radiant heat sent against this special aluminum-coated steel is reflected.

Armco ALUMINIZED gives your products good resistance to a *combination* of heat and corrosion too. Generally, aluminum melts at about 1200 F. But you'll find the hot-dip aluminum coating on ALUMINIZED Steel doesn't melt off at its melting point!

Seems strange, doesn't it? But there's a good reason.

An iron-aluminum alloy starts to form above 900 F. It serves as a good refractory layer up to 1250 F. When it is changed to an alloy the aluminum puts up a protective "fire wall"; the steel core supplies the strength.

If your products are exposed to temperatures in the 300-1250 F. range, let us give you complete information on Armco ALUMINIZED Steel. It is supplied in a wide variety of gages and sizes in sheets and coils.

Write us at the address listed below.

ARMCO STEEL CORPORATION

2802 CURTIS STREET, MIDDLETOWN, OHIO • PLANTS AND SALES OFFICES FROM COAST TO COAST • EXPORT: THE ARMCO INTERNATIONAL CORPORATION

ARMCO

How You Can Help!

In his new book "A Creed for Free Enterprise" (Little, Brown & Co., Boston), Clarence B. Randall points out that production is not an end in itself but is a tool of society. Starting with this premise, he contends that the responsibilities of a business executive are not confined to the internal problems of his business, but extend into the affairs of his community, his government and numerous other outside interests.

Timely because of the national political conventions being held this month are Mr. Randall's views on the responsibilities of business executives in the field of politics. The president of Inland Steel Co. states flatly that under no circumstances should a company executive "attempt, either directly or indirectly, to use economic power to influence the voting of those whom he supervises. . . . This does not mean that he must remain colorless or neutral in the midst of a political campaign. Like every other citizen he should stand up and be counted. . . . It is a perfectly normal phenomenon for two executive officers of the same company to be publicly known as belonging to opposite political parties and to campaign for opposite principles or different candidates."

Mr. Randall believes that the two-party system, "one in power and one in opposition, both vigorous and healthy, is the best device yet found for carrying on the vast business of this great republic and to the extent that it falters we must share our part of the blame."

These views on the part industrial executives should play in politics are sound and practical. Fortunately there is an opportunity right now for every executive in the metalworking industries to become actively engaged in an urgently needed political movement. That movement is to induce more American citizens to vote. It is a national disgrace that only about half of the people entitled to vote take the trouble to do so.

In or near your community probably will be found an organization formed to encourage voting by more people. Contact that organization and do everything you can to help it attain its objective. More votes mean better government!

E. C. Shaner

EDITOR-IN-CHIEF

INEXCUSABLE IDLENESS: One of the unnecessary tragedies of the present steel strike is the idleness of the iron ore fleet. Shortly after the steelworkers were called off their jobs, the 21,000 miners in the upper lake ranges broke off their contract negotiations and walked out in sympathy. As a result most of the ore carriers are idle, shipments to lower lake ports

to date already are 10 million tons less than they were a year ago, and each additional day of idleness (p. 56) means a loss of 200,000 tons of ore in blast furnace and ore dock stockpiles.

The strike in the mines serves no useful purpose in solving the steelworkers' dispute, yet it may cause a shutdown of furnaces next winter long after the steel strike has been settled. It should not be difficult for Phil Murray to iron out the technicalities which are keeping the ore fleet idle during this perfect navigating weather.

* * *

MOVIES ARE POPULAR: Industrial moving pictures are assuming important roles in the activities of many companies in the metalworking industries. They are being used to an increasing extent to train personnel; to acquaint customers with the performance of materials, products or machines; and to perform a wide range of educational and promotional functions. It is estimated (p. 59) that from 5000 to 6000 companies now are employing industrial movies regularly.

This growth is not surprising. Modern techniques permit movies to show and explain the operation of a mechanism or a metallurgical process in ways that are impossible by any other medium. The 16 mm sound, black and white or color movie has become almost indispensable to many companies.

* * *

END UNION MONOPOLY: Each day that the steel strike is prolonged adds to the pressure that is building up against members of congress to do something to avert recurrence in the future. Washington observers who are in a position to judge the temper of our lawmakers say (p. 62) that it is simply a matter of time until they amend the Taft-Hartley act to prohibit industry-wide, union-wide bargaining and to outlaw labor and industry monopolies which threaten national crises.

American history has proved that the public will not tolerate monopoly in any form indefinitely. There is mounting evidence that the man in the street is becoming fed up with recurring industry-wide tie-ups. Sooner or later patience will run out and congress will be forced to act. Unions have no inherent right to monopoly.

AN UNSOLVED PROBLEM: Glancing through the "letters to the editor" on the editorial page of a metropolitan newspaper we find this gem: "Upon looking at the television schedule in your paper I noticed that the word 'convention' dominates the schedule. I do not think carrying of the convention on all channels simultaneously is fair to the television-viewing public. The cancellation of scheduled non-convention programs is even less fair to TV viewers who should have the right of choosing their own programs. The convention and its proceedings are above the heads of most average Americans. In fairness toward the public which is not the least interested in the Republic convention, or any convention for that matter, I believe" etc., etc.

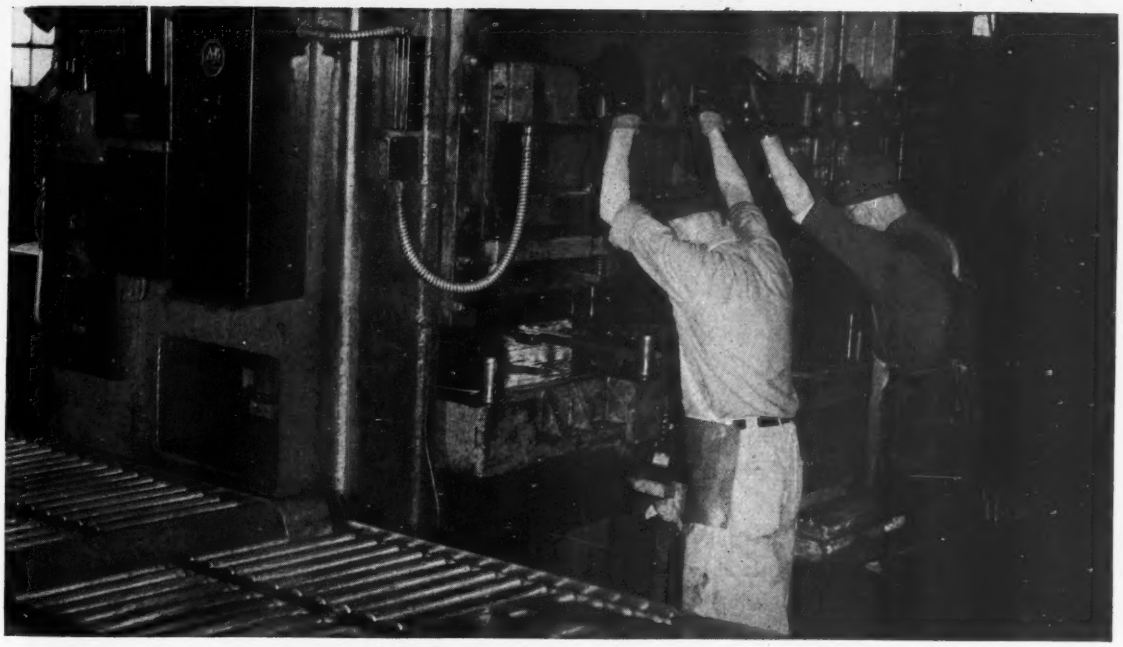
Here is a man intelligent enough to write a letter to the editor yet so self-centered and so unaware if his responsibility as a citizen that he cannot understand why anybody should be interested in a political convention. How to bring the light of reason to persons of this type remains one of the unsolved important problems of our time.

* * *

PROPHETIC AND IRONIC: In his keynote address to the Republican national convention, Gen. Douglas MacArthur quoted this warning delivered on the floor of the United States senate by Democratic Senator Benjamin Hill of Georgia many years ago:

"I do not dread (industrial) corporations as instruments of power to destroy this country, because there are a thousand agencies which can regulate, restrain and control them; but there is a corporation we may all well dread. That corporation is the federal government. From aggressions of this corporation there can be no safety if it is allowed to go beyond the well-defined limits of its power. I dread nothing so much as the exercise of ungranted and doubtful powers by this government. It is, in my opinion, the danger of dangers to the future of this country,"

How prophetic and how ironic it is that the danger he foresaw so accurately was to be thrust upon the nation by mistakes of members of his own party!



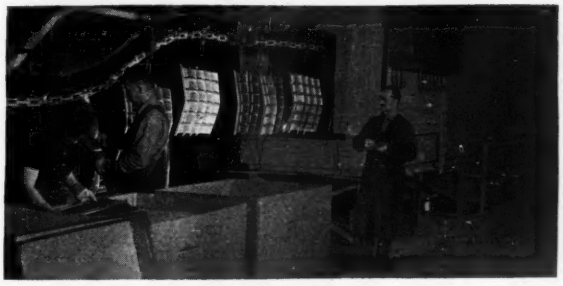
MULTI-OPERATION PRESSES MEAN FASTER PRODUCTION & LOWER COSTS AT Firestone

Valuable time and money are saved on defense sub-contracts and civilian requirements at Firestone Steel Products as fast, modern, multi-operation stamping operations are integrated with welding, heat treating, bonderizing, painting or polishing, into low cost, straight-line production.

These modern facilities with widely experienced personnel are at your service. If your problem is large steel stampings or sub-assemblies in carbon steel, stainless steel, or aluminum, check with Metal Stampings Division, Firestone Steel Products Co., Akron 1, Ohio.

No Prayer Here!

These men could be in supplication for more speed—more production — but actually they are showing teamwork in the production line. These two operators and a third man behind the press, all must have both hands on safety buttons above their heads before the press will operate. This is one of the many, many safety practices at Firestone.



Washing, bonderizing, painting and baking are handled in a continuous operation, moving entirely on conveyors from the stamping line.

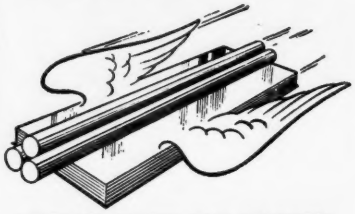
Fast, efficient, straight-line methods save time and handling at Firestone. Parts move from presses on rollers or overhead conveyors to next operation.

Copyright, 1952, Firestone Steel Products Co.

Which of these special-purpose steels do you need...*NOW?*

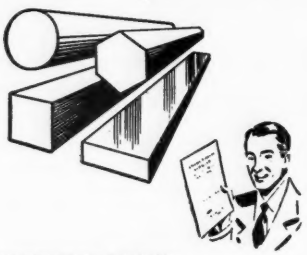
Call Ryerson for Quick Shipment

Right now, users of special purpose steels can get most of their requirements quickly—with one call to one convenient source. All the steels described on this page are in better-than-average supply at the Ryerson plant near you. All are high quality steels that conform to exacting specifications. Use this page to check the items *you* need, and save time by ordering them next time you call Ryerson.



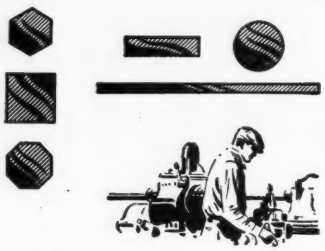
AIRCRAFT ALLOYS AND STAINLESS

Alloy bars, sheets and strip in more than 400 sizes, finishes, conditions. Stainless in more than 300, to meet all important aircraft specs.



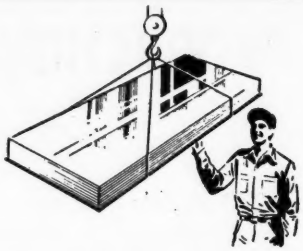
STANDARD ALLOYS

Rounds, flats, hex's, squares—hot rolled and cold finished—complete heat treatment guide with each shipment.



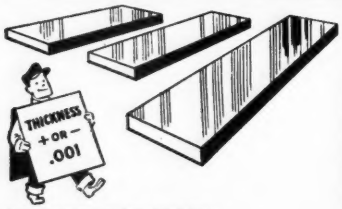
TOOL STEEL

Water, oil or air hardening tool steels. High in quality; economical in price. Hardening data with every shipment.



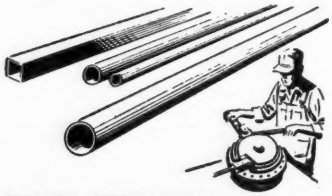
STRAIGHT CHROME STAINLESS

No allotment required for these stainless bars, plates and sheets. Can often replace restricted nickel-chrome types.



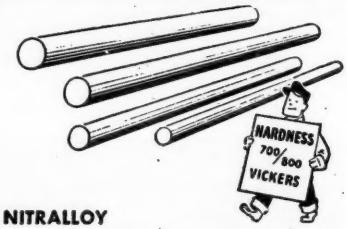
GROUND FLAT STOCK

High grade, non-deforming tool steel. Saves machining, speeds production. For accurate-to-size parts, tools, dies.



WELDED MECHANICAL TUBING

Hot and cold rolled, rounds and squares in a wide range of sizes. Consider cost—substitute for seamless tubing.



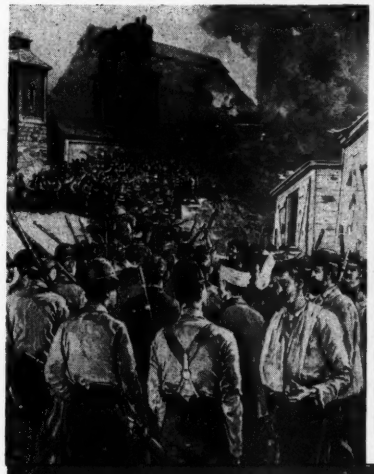
NITRALLOY

Develops extremely high surface hardness after nitriding. Unequalled for parts subject to abrasion. Large stocks.

OTHER PRODUCTS: CARBON STEEL BARS, STRUCTURALS, PLATES, SHEETS, ETC.

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CINCINNATI • CLEVELAND • DETROIT
PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE



1892: Homestead Strike

1919: Organizational Strike

1937: Little Steel Strike

1949: Pension Strike

1952: Strike of Steelworkers for Union Shop

Steel Strike: Quiet but Costly

Other walkouts have been more picturesque, but this one will be the most expensive in U. S. history. It could send our economy into a deflationary spin

OTHER STEEL strikes have been more violent and more colorful, but none has been more costly than this one.

Other labor battles in the industry have been given titles like the Homestead Riot of 1892, the Little Steel Strike of 1937, the Pension Fight of 1949. This one may become known as the Attrition Strike of 1952.

On the Brink—For we're close to attrition now. The cupboard is practically bare of steel in many plants. The cupboard is practically bare in the home of many a steelworker. He has lost nearly $500 in wages from June 2 to date. The table shows the tonnage losses to steel consumers since June 2.

What Price Union Shop?

Steel Strike Cost: June 2 to Date

TO THE STEELWORKER:
$477.25 in lost wages

TO THE STEEL USERS:
11.7 million tons of lost ingots

TO THE ECONOMY:
$2.4 billion in total lost sales, wages

Add another 1 million tons for the walkouts in April and May. The total cost to the economy thus far of $2.4 billion may tip us over the brink into a slump. A three or four-week walkout could have been inflationary by "firming" the market, but as strike losses mount those buoyant factors steadily weaken and finally shift to the deflationary side.

What might happen now parallels what did happen in 1937 and 1938. At the start of the 1937 fight, the economic outlook was good. At first the strike effects apparently would serve to give another inflationary push to business. But the walkout in less than half the industry lasted nearly all summer. Economic historians now agree that it contributed heavily to the setbacks of 1938.

Other Side of Coin—The 1952

Where Third and Fourth Quarter Materials Will Go

	4th QTR. 1952 ALLOTMENTS		3rd QTR. 1952 ALLOT. AUTHORITY (as of June 27, 1952)	
GENERAL CLAIMANTS	TOTAL COPPER (000 lbs)	TOTAL ALUMINUM (000 lbs)	TOTAL COPPER (000 lbs)	TOTAL ALUMINUM (000 lbs)
Agriculture Dept.	643	45	1,085	45
Army Dept.	1,418	70	1,475	148
Atomic Energy Com.	3,512	3,324	5,479	5,804
Civil Aero. Adm.	703	416	1,172	470
Defense Dept.	269,887	250,000	252,366	227,000
Defense Elect. Power Adm.	55,597	50,000	64,750	59,800
Defense Fisheries Adm.	25	4	25	4
Defense Mat. Procure. Agcy.	1,988	350	2,120	350
Defense Solid Fuels Adm.				
Coal Mine Const.	460	25	383	25
Coke Oven Const.	354	5	382	5
Defense Transport Adm.	2,368	150	2,829	150
Fed. Civil Defense Adm.	82	20	60	20
Federal Security Agency				
Education	5,800	200	5,520	226
Hospitals	3,875	390	3,325	230
General Services Adm.	3,920	100	4,122	100
Housing, Home Fin. Agcy.	3,400	.....	3,320	100
Interior Dept.	142	20	148	25
Maritime Adm.	1,821	82	2,146	150
O I T—M S A	10,320	5,250	10,460	3,100
Petro. Adm. for Defense	8,752	1,700	9,150	1,500
Public Roads Bureau	980	130	785	200
Veterans Adm.	910	54	1,175	55
General Claimants—Total	376,957	312,335	372,277	299,507
NPA DIVISIONS				
Agric. Mach. & Impl. Div.	9,339	13,806	9,511	11,892
Aircraft Div.	1,352	10,622	1,809	10,745
Alum. & Magnesium Div.	.....	300	.....	766
Building Maters. Div.	74,972	87,261	76,209	83,262
Canadian Div.	2,995	2,400	3,335	1,900
Chemical Div.	1,712	4,350	1,633	5,004
Communications Equip. Div.	57,880	4,700	58,973	4,147
Construction Mach. Div.	7,371	2,780	7,275	2,545
Consumer Dur. Goods Div.	58,730	88,286	54,029	87,508

	4th QTR. 1952 ALLOTMENTS		3rd QTR. 1952 ALLOT. AUTHORITY (as of June 27, 1952)	
NPA DIVISIONS	TOTAL COPPER (000 lbs)	TOTAL ALUMINUM (000 lbs)	TOTAL COPPER (000 lbs)	TOTAL ALUMINUM (000 lbs)
Containers, Pkg. Div.	432	27,750	472	29,602
Copper Div.	3,580	1,800	3,700	1,785
Electric Equip. Div.	163,328	34,850	159,203	33,130
Electronics Div.	29,837	13,281	31,206	12,491
Engine & Turbine Div.	29,178	3,091	31,130	2,927
Facilities Bureau—Total	21,750	11,700	32,155	10,478
General Components Div.	183,274	22,601	181,361	21,722
Gen. Indust. Equip. Div.	51,260	23,868	50,537	26,968
Iron & Steel Div.	5,296	110	4,391	110
Leather, Leather Prods. Div.	1,451	1,028	1,065	743
Lumber—Wood Prods. Div.	156	1,190	160	1,147
Metalworking Equip. Div.	30,556	9,345	29,716	9,347
Mining Machinery Div.	3,675	200	3,449	230
Misc. Metals & Min. Div.	2,700	160	2,850	163
Motion Pic.-Photo Prods. Div.	1,276	3,101	1,284	3,268
Motor Vehicles Div.	127,596	72,637	127,596	72,606
Ordnance & Shipbldg. Div.	14,320	1,845	13,067	1,630
Printing & Pub. Div.	1,177	642	1,160	615
Pulp, Paper & Paperbd. Div.	61	160	65	147
Railroad Equip. Div.	86,300	5,135	86,323	4,973
Rubber Div.	3,510	880	3,760	850
Scientific, Tech. Equip. Div.	43,205	14,421	43,447	14,873
Service Equip. Div.	8,312	10,460	5,088	8,804
Water Resources Div.	2,686	150	2,715	200
NPA (Ex. Reserves)—Total	1,029,267	474,910	1,028,674	466,578
NPA Reserve (General)	11,000	5,000	11,187	1,675
NPA Reserve (Hardship Cases)	4,000	3,000	6,119	6,839
NPA Field Case Account	24,750	18,500	28,194	22,501
DPA Total Reserve Set Asides	134,677	60,808	107,023	50,213
Grand Total	1,580,651	874,553	1,553,474	847,313
Supply	1,355,000	731,000	1,294,000	724,000
% of Supply	116.7	119.6	120.1	117.0

strike is setting up strong inflationary forces that still will be in operation despite the deflationary ones also started. One is the new steel shortage. A scarcity always has inflationary aspects. The second quarter carryover of unfilled orders for steel products stands at 10 million tons, with the third quarter booked almost solid in the big mills. Expect a minimum additional carryover of 6 to 7 million tons of finished when the fourth quarter starts. No matter what happens, at least the equivalent of 45 days' steel output will be lost by the strike. That parallels the legal 45-day inventories of most steel products that consumers can stock. So, the cupboards are bare.

To put a little steel in the stocks of the most deserving cases, such as the military, food packers and oil drillers, NPA has already been allocating the production of the 13 per cent of the industry still operating. It has also moved 50,000 to 70,000 tons of finished products out of struck mills and warehouses until they're about depleted. It has dropped plans to process semifinished in struck plants and to open a few struck facilities.

Waiting—All that can be done by planners, now, is to await the time when the industry gets rolling again. When that happens, the second and third quarter carryovers would have top priority on fourth quarter production. A series of specific set-asides of mill space will be set up to take care of fourth quarter military needs as much as possible. The set-asides—described by some as the way to avoid balancing supplies against outstanding tickets—will be backed up by a sparing use of production directives. Expect some new distribution controls on end products.

The steel shortage and its inflationary effects won't be relieved by the situation in iron ore. Mills closed by the steel strike are threatened with another shutdown next spring because of no ore. Lake shipments of iron ore—down to a dribble because of sympathy strikes—are already 13 million tons less than the shipments for the same period in 1951. Each day when ore is not shipped nearly 200,000 tons are being added to next spring's potential scarcity.

Under Control—The steel and ore situation means that steel decontrol can't come until a year from now—"if then," NPA Administrator Henry H. Fowler adds. Because steel delays expansion plans in the aluminum industry, not quite as much of that metal will be available by the end of this year as first thought, and decontrol originally considered for December won't come as soon. Copper, which might have been decontrolled nine or ten months from now, won't be unshackled then, for the same reason.

Judge for yourself the effects controls have on the economy. It all adds up to this: Market research people are now considering the possibility that this costly steel strike will tip the delicate balance between boom and slump to the latter.

Price Hike "No" During Strike

No above-Capehart price increases will be granted steel companies who have made peace with the union until after the entire steel strike is settled. Weirton Steel Co. was turned down in its bid for an above-Capehart hike last week by Price Boss Ellis Arnall. Armco Steel Corp. and Pittsburg Steel Corp. are expected to get similar replies.

The decision to give a greater increase will come from a higher level.

Hit and Miss Allotments

Steel allotments for the fourth quarter are postponed but copper, aluminum antes increase

IF THERE are no copper and aluminum strikes, you'll do better on allocations of these metals in the fourth quarter. You'll definitely do worse on steel.

So uncertain are prospects in steel, that Defense Production Administration won't make its decision on distribution of the metal until after the effects of the strike can be better appraised. Advance fourth quarter allotments for steel products (generally 80 per cent of third quarter allotments) will not be disturbed, although adjustments may be necessary later.

Estimated — The copper and aluminum decisions for the fourth quarter (See table on p. 56) are made on the estimated availability of 402,000 tons of refined copper, including 160,000 tons from foreign sources, and a minimum aluminum supply of 731 million pounds. Some 57,000 more tons of copper should be available fourth quarter than third.

More brass has been allotted in the fourth quarter than in the third for ammunition. More aluminum is earmarked for increased production of higher-performance aircraft. Allotments for other defense programs are about the same in both quarters. For major producers of civilian products, who require more copper or aluminum than permitted by the recently increased self-certification limits, the allocation will permit allotments at about the same levels reached in the third quarter—50 per cent of the base period for copper and 55 per cent for aluminum.

New Requisite for Tax Write-offs

Proper dispersal of proposed industrial plants will be a requisite for most firms seeking certificates of necessity for fast tax write-offs, announces Henry H. Fowler, DPA administrator. Implementing the National Industrial Dispersion Policy, the DPA will require the recommendation of one of the 60-odd local dispersion groups to accompany write-off applications.

Dispersal must be approved if the proposed facility is estimated to cost $1 million or more, or the facility when completed will produce 15 per cent or more of the national total of the defense-supporting product involved.

Local dispersion groups in reviewing proposed industrial sites will consider such items as existing concentrations of population or industrial plants and availability of alternate transportation routes and power sources.

$50 Billion To Go

That's the value of defense contracts now outstanding, according to mobilization reports

SOME $50 billion worth of defense contracts for defense goods and military construction are outstanding in contracts with industry and government arsenals and yards.

So reports John R. Steelman, acting director of defense mobilization, in the sixth quarterly report on rearmament activities. Of the $94 billion appropriated for the military in the two years since the Korean War began, about $34 billion worth of contracts have been completed.

Up and Up—An estimated $8 billion was delivered in the second quarter, an increase of 20 per cent over the previous quarter and more than six times the rate of military procurement and construction at the time of the Korean invasion two years ago. The $8 billion delivered in the last quarter means that we are 75 per cent of the way toward the $10.5 billion quarterly rate scheduled to be reached early in 1953 and maintained throughout the rest of that year and 1954 as the plateau of the program.

Deliveries of military aircraft, now over 800 a month, are more than three times the rate of two years ago, figured either in number of planes or in airframe weight. Total aircraft engine production has increased on the same scale as aircraft — triple the pre-Korean rate. Jet engines comprise a steadily rising proportion of the total, reports Mr. Steelman. Production of ammunition will continue to climb and by next September will for the first time be above the highest average rates of consumption in Korea to this time.

Victim of Progress

Pre-Revolutionary iron-making methods returned to the historic site of Hopewell Village, Pa., when the National Park Service restored the water wheel that supplied the blast for Hopewell's furnace from 1770 to 1883. The 22-foot wheel is turned by water from Hopewell Lake and operates the machinery that provides the great blast of air necessary for smelting iron. The furnace itself will remain cold

Spectacular—Production of electronics is now running at seven times the low rate at the time of Korea, when less than 5 per cent of the major military electronics now in the program were in production. During the last six months, 52 major electronic items were first brought into volume output. The greatest electronic developments have been in radar.

In military construction an estimated $6 billion worth was under way or in the design stage as of Apr. 30. About 80 per cent of those will be completed before Dec. 31, 1953. In construction for atomic energy, the government wants to spend $3.9 billion for new facilities.

Spotty—Our materials position for a full-scale war, says Mr. Steelman, is dangerous for a few materials. We spent $345 million to add to the stockpile in the second quarter, compared to $162 million in the first and $94 million in the last quarter of 1951.

Union Security: Labor's Grip Tightens

PHIL MURRAY in his union-shop demand is trying to give momentum to a trend toward greater union security that some industrialists believe has already gathered alarming speed.

That trend toward more union security is indicated by Associated Industries of Cleveland's annual survey of firms employing over three-fourths of the city's total workforce. With industry-wide bargaining, it's a pretty good guide to the nation as a whole. Some of the things they learned:

UNION SECURITY

Management is granting union security more frequently, the survey shows. Of the 48 firms in the Cleveland area doing business with the UAW-CIO, 15 reported they had signed a maintenance of membership agreement with the union, 26 have granted the union shop and two have combination shops. Only five companies have avoided signing a union security clause of any kind, while in 1951, 13 plants operated an open shop. In return for the security, management is demanding more responsibility from labor. Comprehensive "no strike" pledges were exacted from their unions by almost one-third of the companies and one-fifth more reported a "no strike clause" covering authorized strikes only.

ESCALATOR CLAUSE

Despite the demand of unions to tie wages to the cost of living, only one-fifth of management agreed to do so on a formal basis, as compared with one-sixth a year ago and the majority of them are in the "big company" category. Of the seven per cent which have accepted the idea as policy, many are in the more-than-500-employee classification; the majority in the more-than-1000-worker category.

HOLIDAYS

About 85 per cent of the Cleveland firms still pay for the standard six holidays, but management is beginning to relax its eligibility requirements. Formerly the rule that an employee had to work the day before and the day after a holiday was almost uniform. Now an increasing number require no eligibility stipulations at all.

INSURANCE

Pension arrangements are still primarily a large-company practice. The compromise on this issue is insurance, and management has liberalized its insurance program considerably during the past year, particularly in respect to hospitalization. Only 4.6 per cent of the companies covered reported they did not include this benefit, though small firms provide only the administrative machinery and the worker pays the full cost of the premium. Only 15.6 per cent of the manufacturers covered pay for the worker's dependents, despite such a trend.

GROUP LIFE

In 1951 only 34.5 per cent of the firms reporting gave insurance on a contributory basis. Today 44.6 per cent kick in. Where insurance is being adopted by management as a result of either contract negotiations or in an effort by an employer to conform to community pattern the company is generally in the fewer-than-500-employment classification, but 24 per cent of the total still do not give group life as a fringe benefit, mostly among firms employing less than 100 workers.

PENSIONS

Pensions are largely a big-company practice. Fifty-one per cent of the firms replying give no pension benfits as compared with 62 per cent last year but firms employing over 1000 workers are generally falling into line and setting up pension programs. The heat is on those in the 500-1000 class to make retirement arrangements for employees, too. Pension plans are still based on length of service plus earnings, provide $50 to $150 monthly.

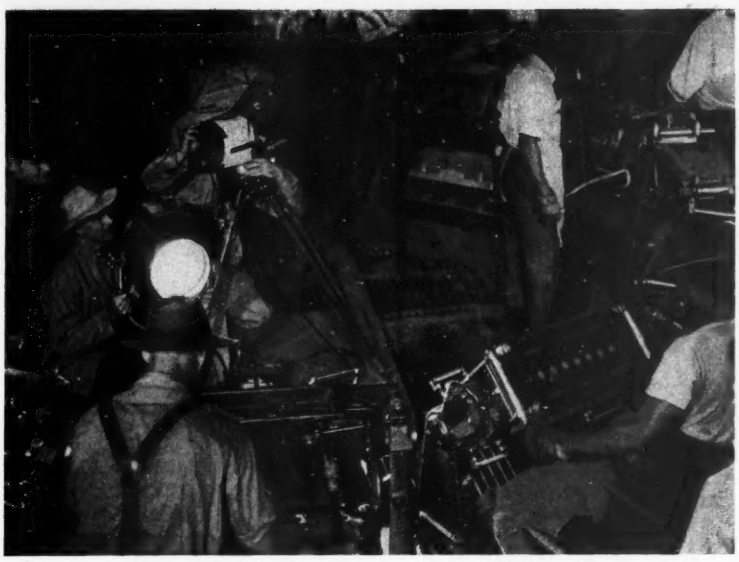
OVERTIME

While time and a half for all hours over 40 in a week and time and a half over 8 hours in a day are mandatory under the Fair Labor Standards and Walsh-Healy Acts, unions have made progress in persuading companies to pay time and a half for Saturday and double time for Sunday as such. Formerly it was time and a half for the sixth day worked and double time for the seventh. Unions have not met with success for triple time on holidays, however.

SHIFT DIFFERENTIALS

The cost of shift differentials have jumped from five cents to seven for the second shift; ten cents for the third shift is usual.

Despite wage and price controls, the bill management pays for worker services and security benefits over and above wages is being upped steadily. The average Cleveland firm employing a thousand or more people spends approximately 30 cents an hour on such fringe benefits as insurance, pensions, vacations, holidays and shift differentials—smaller firms nearly as much. The bill on fringes has climbed four cents per annum every year since 1949. It's a good guess that the next year is going to bring its four cents, too.



INDUSTRIAL MOVIES ARE ON THE JOB AT FORD
. . . they can explain some operations better than words

Industry Goes to Movies

LIGHTS! CAMERA! ACTION! And soon settling back to watch another industrial movie may be your customers, your shop workers, your prospective customers or your plant supervisors.

Whatever its purpose—to instruct, to familiarize, or to entertain with your compliments—your industrial movie is the product of a booming $50-million-a-year industry. There are about 200 recognized producers of industrial films and slides; 50 of these do 80 to 85 per cent of the annual sales volume.

What's It Cost?—Their major product is the 16 mm, sound, black and white or color movie, which carries a price tag of from $1000 to $160,000. Ingredients, such as script, actors and location, vary widely in industrial films, but a good rule of thumb of the cost for a top-notch color movie is: $1000 per minute of running time.

The big impetus in the growth of industrial moviemaking came during World War II. The Navy found that its trainees remembered 40 per cent of what they "saw" and remembered it 55 per cent longer than that which they only heard or read. Industry, too, had a lot to teach a large force of green workers. It wasn't long before industrial movies were showing trainees how to operate a machine, how to be boss when their turns came.

Motion at a Standstill—Movies were soon found to offer unique advantages. They can take the viewer inside a mechanism, can cover space and time in a flash, can slow down an action or break it into its components. Movies can dramatize objects and concepts, and demonstrate a skill or product which cannot be clearly explained any other way.

Now, some 5000 to 6000 companies show films at least once each year and several thousand of these companies are more active than that, says O. H. Coelln, editor and publisher of *Business Screen* magazine. *Business Screen* is regarded as the bible of this industry, reports Jack Lane of Depicto Films Inc., New York. The average industrial movie gets 3.5 showings a month. Another indicator of the growth of the 16 mm movie industry and its increasing value to metalworking is the number of projectors in use: About 40,000 before World War II, from 450,000 to 500,000 in 1952.

And Still Growing—Jam Handy Organization Inc., Detroit, credited by some with having a larger animating department than Walt Disney, now turns out three times as many movies as one of the largest Hollywood moviemakers.

Latter day refinements have developed Hollywood-type industrial movies, such as some of those made for the automobile makers, which can cost upwards of $100,000. Scripts alone can command as much as $7500 to $10,000. Ford, Chrysler and GM report their films, including some of these extravaganzas, were viewed by over 30 million people in 1951.

Low Cost Productions—But astronomical cost figures need not scare most medium size firms out of the movie-making idea. Modern techniques like multi-camera production, an outgrowth of TV practices, used by Cine Craft Productions Inc., Cleveland, can turn out a 30 minute film in one day's shooting compared with weeks required by older methods.

The trend is definitely away from using movies strictly as a vehicle for advertising. At least 50 per cent of the films being made are institutional in character with little "sell."

Is it good business? According to current estimates, industry will spend about $70 million this year for all types of films.

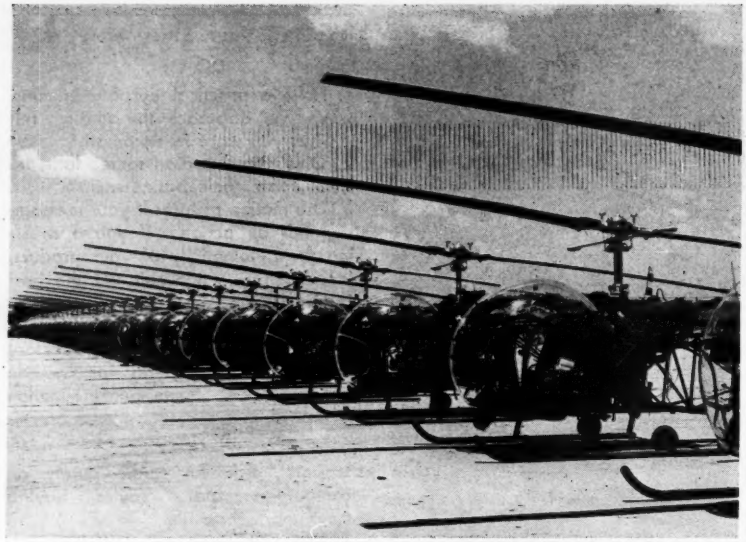
Telling Your Story on Film?

DO . . .

1. Have a practical purpose in mind when you approach the studio. Tell it what you want to accomplish.
2. Give the studio some latitude. They know their business.
3. Use motion pictures if your message depends on action. If you're stressing the automaticity of your product, for example, you won't get the best results from a slide film.
4. Make the presentation complete. The studio may prepare introductory and/or closing remarks for a slide film exhibitor. Some personalization is desirable.

DON'T . . .

1. Don't pick the studio purely on competitive bids. You're buying much more than film.
2. Don't be dogmatic. Don't predetermine you want a movie. A slide film may do your job better or at least as well at less cost.
3. Don't overlook the importance of proper training of the exhibitor.



BELL AIRCRAFT MODEL 47 HELICOPTERS AWAIT DELIVERY
. . . all now go to armed services while civilian market ripens

Helicopters: Market Goes Straight Up

Producers of "flying windmills," which are used extensively in the armed services now, will require even more metalworking equipment when defense needs subside

IT'S A PLANE. It's a bird. No, it's the newest luminary in the ever exciting aircraft industry—the helicopter. With the equivalent of ten years of development in the two years since Korea, the helicopter industry is well on its way to being an important metalworking market for materials, components, machine tools, other equipment.

For 17 months the Air Force, Army, Navy, Marines and other government services have taken all the helicopters made and the industry has responded with an impressive expansion program. A number of new companies have come into the field.

Backlog Leapfrogs—Today, the industry has a backlog of military orders estimated at $500 million, with continued procurement ahead. Most of the companies are doing research work financed largely by the armed services, aimed at making the helicopter a still more useful and versatile tool.

Since commercial flying experience is of great value to the armed services, the Defense Department has just given permission for delivery of a 12-passenger helicopter to Los Angeles Airways. The $135,000 copter will be used to carry local mail and passengers.

Commercial Windmills — Helicopters, first sold commercially only five years ago, now cost a minimum of $21,450 and average annual operating cost is $30,000 for full use. Agricultural dusting, power line patrols, forestry patrols, flight between farms and nearby cities and geological and mapping surveys are some uses.

Helicopter manufacturers now performing production or experimental work for the government, or considering such work, include: Helicopter Division, Bell Aircraft Corp., Helicopter Division, Cessna Aircraft Co., Doman Helicopters Inc., Hiller Helicopters, Aeronautical Division, Hughes Aircraft Corp., McDonnell Aircraft Corp., Piasecki Helicopter Corp., and Sikorsky Aircraft Division, United Aircraft Corp.

Other manufacturers include Jacobs Aircraft Engine Co., Gyrodyne Co. of America, American Helicopter Co. Inc., Kellett Aircraft Corp., and Rotor-Craft Corp.

WSB: New Faces, No Teeth

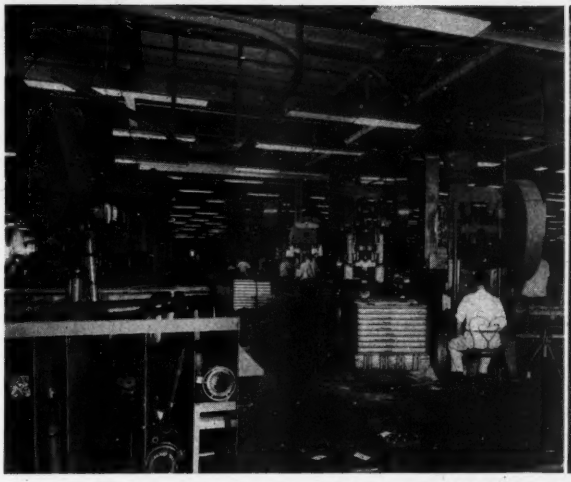
The Wage Stabilization Board will have its disputes-authority teeth pulled effective July 30. On that date a new board will be appointed subject to confirmation by the Senate with no jurisdiction with respect to any labor dispute except in relation to stabilization of wages, salaries and other compensation. The old board could handle labor-management disputes certified to it by the President as constituting a substantial threat to national defense or voluntarily submitted by the parties.

Also effective July 30, some 2 million small businesses employing eight or less workers will be removed from wage controls, with exceptions to be named by the President.

There is one group already nipped from the benefit group: Tool and die shops, due to the competition for mechanics in the industry. The newly-amended Defense Production Act also provides that hourly wages of less than $1 may be brought up to that figure without WSB approval.

SELECTED DEFENSE CONTRACTS IN EXCESS OF $250,000

PRODUCT	CONTRACTOR
Lathes, Engine	Sheldon Machine Co. Inc., Chicago
Grinders	C. H. Gosiger Machinery Co., Dayton, O.
Milling Machines	Van Norman Co., Springfield, Mass.
	Cincinnati Milling Machine Co., Cincinnati
Aircraft Engines	Allison Div., General Motors Corp., Detroit
Wheel & Brake Assemblies	Goodyear Tire & Rubber Co., Akron
Aircraft Kits	Boeing Airplane Co., Seattle
Starters	Eclipse-Pioneer Div., Bendix Aviation Corp., Teterboro, N. J.
Amplifiers	Olympic Radio & Television Inc., Long Island City, N. Y.
Parts for Radio Sets	Magnavox Co., Ft. Wayne, Ind.
Motor Vehicle Parts	International Harvester Co., Chicago
	Diamond T Motor Car Co., Chicago
	Northwestern Auto Parts Co., Minneapolis
Motor Vehicle Tools	Creative Metals Co., Emeryville, Calif.
	Algonac Mfg. Co., Algonac, Mich.
Shells, 105 mm	Kelsey-Hayes Wheel Co., Detroit
	Kohler Co., Kohler, Wis.
Mines, Anti-Personnel	Lehigh Foundries Inc., Easton, Pa.
Fuzes	Precision Castings Co., Fayetteville, N. Y.
	Stewart-Warner Corp., Alemite Div., Chicago
Cartridge Cases	Vulcan-Hart Mfg. Co., Baltimore
Feed Mechanisms, 20 mm	Rochester Mfg. Co. Inc., Rochester, N. Y.
Telescopes, M-65	Graflex Inc., Rochester, N. Y.



Some Highlights at the New Black & Decker Plant

A new plant is in operation for the Black & Decker Mfg. Co., one of the world's largest manufacturers of portable electric tools. Located on a 185-acre tract near Hampstead, Md., the plant, designed and constructed by Austin Co., Cleveland, covers 100,000 square feet with more room for expansion. Clear height of 15 feet gives presses, at left, ample room for efficient operation. Wood-block flooring and high-level light intensity increase employee safety and comfort. In the picture at right, the flexibility of the plant is illustrated by the winding field and stator line, to the left, and the storage area. Wide column spacing results in easily accessible storage space

CHECKLIST ON CONTROLS

Materials Orders

COPPER RAW MATERIALS—Amendment of July 2, 1952, of Direction 1 to NPA Order M-16 permits brass and bronze foundries, wire mills, brass mills and miscellaneous users to place advance orders for copper raw materials and to increase the quantity which may be ordered. Beginning with the July allocations, producers and miscellaneous users of copper raw materials who receive authorizations to accept delivery of copper raw materials for a given month will be permitted to place orders for delivery in the next two succeeding months up to the following percentages of the quantities of materials specified in the authorization: 50 per cent of copper raw material other than refined copper; 75 per cent of the quantity of domestic refined copper; and 100 per cent of the quantity of other refined copper, including foreign refined copper. The amendment was effective July 2, 1952.

IRON, STEEL—Amendment of July 3, 1952, of NPA Order M-1 simplifies the issuance of production and allocation directives to iron and steel producers and makes minor changes in Table 1 of the order. Only significant change is that iron and steel pipe over 36 inches in diameter will not be a controlled material, starting with first quarter, 1953.

JACKS—Amendment of July 3, 1952, of NPA Order M-83 liberalizes this order by removing specification controls from two kinds of jacks. The amendment was effective July 3, 1952.

CONSTRUCTION MACHINERY — Amendment of July 3, 1952, of NPA Order M-43 tightens the use of priority ratings for procurement of construction machinery. It also provides that no manufacturer shall be required to accept rated orders for delivery in any one month for any model of any type of construction machinery (including parts) in excess of 50 per cent of his production schedule of that model for that month, or 50 per cent of his average monthly shipments of that model during the six-months period of Jan. 1 1950, through June 30, 1950, whichever is greater. The amendment was effective July 3, 1952.

ELECTRIC EQUIPMENT — Direction 1 to NPA Order M-44 lists normal lead times for certain major electrical equipment items and stipulates that delivery dates within these lead times will not be rescheduled except in cases of defense emergencies. The action is designed to prevent loss of production of equipment vital to defense. One of the most important factors interfering with production has been rescheduling of orders. Direction 1 was issued July 7, 1952, and made effective on that date.

ALUMINUM FOIL — All end-use restrictions on aluminum foil for packaging and similar purposes were removed through revocation of NPA Order M-67 on July 14, 1952.

NPA Regulation

STEEL—Direction 5 to NPA Regulation 2 requires producers of steel and products containing steel to reschedule their operations so as to assure delivery on all orders covered by NPA individual directives in the sequence of their original specified delivery date. It also gives producers the right to postpone specified delivery dates where the date can't be met because of the current work stoppage.

Price Regulations

NICKEL ALLOY SCRAP—Amendment 8 of Ceiling Price Regulation 5 permits the charging of a premium for iron and steel scrap with a nickel content between 0.5 per cent and 1 per cent and between 5.25 per cent and 7 per cent. These ranges are in addition to the present range of from 1 per cent to 5.25 per cent. The premium remains unchanged. The changes in ranges are designed to encourage the segregation and reclamation of nickel-bearing scrap. The amendment was effective July 12, 1952.

ROUNDING OF PRICES — Amendment 49 to Ceiling Price Regulation 22 permits rounding of manufacturers' ceiling prices to make possible the preservation of customary discount structures between manufacturer and retailer on branded merchandise customarily resold at uniform prices. The amendment was effective July 12, 1952.

REFRACTORIES — Amendment 9 of Ceiling Price Regulation 67 places resellers of refractory product under the same regulation as resellers of machinery and related manufactured goods. Resellers have been under the General Ceiling Price Regulation. Amendment 9 is effective July 14, 1952.

Appointments in Washington

William M. Day, on leave from Michigan Bell Telephone Co., Detroit, of which he is vice president and general manager, was appointed assistant administrator, National Production Authority, in charge of the Metals & Minerals Bureau.

New section chiefs in the NPA Metalworking Equipment Division: Industrial Heating, Les A. Shea, on leave from Lindberg Engineering Co., Chicago; Machine Tool Attachments & Accessories, Howard S. Williams, of Mau-Sherwood Supply Co., Cleveland; Cutting Tools, Anthony J. Snyder, of Morse Twist Drill & Machine Co., Sidney, O.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor*

The steel strike could kill union power. Congressmen are becoming aroused over failure to use the Taft-Hartley Act and may vote an end to industry-wide union monopoly

AN END to the arbitrary power of union leadership may be forced by the steel strike. In Washington it is regarded as simply a matter of time until the Taft-Hartley Act will be amended to eliminate industry-wide, union-wide bargaining and to outlaw labor and industry monopolies which threaten national catastrophe.

The one vital feature of the Taft-Hartley Act which, in the opinion of most Washington authorities, would have prevented the steel strike, is that in Section 209 (b). This provides that if a strike has not been settled within 60 days after granting an injunction, the National Labor Relations Board "shall" take a secret ballot of the employees on the employers' last offer.

Unused Tool—If union membership accepted the employers' last offer—and opinion is that the steelworkers would accept the last offer in a secret election—that would be the end of the arbitrary power of union leadership. But it hasn't been used, nor has it even been mentioned by the President in his public statements.

In Congress, the significance of the provision is well understood, but diplomatic and political considerations prevent the average congressman from spelling it out.

Pressure Mounts—But pressure is mounting, and a number of congressmen have gone so far as to declare that the President, by refusing to use this law, has made himself liable to impeachment. Impeached or not, Mr. Truman will probably find his views left out of the new legislation that is needed.

If the President ever does use the law against the workers, odds are he won't make the move until after the Democratic convention is over. Obvious political reasons are behind that timing. Mr Truman wouldn't hesitate so long if he thought he could use provisions in the law against the employers.

Centerless And Pointless

An $11,000 United States centerless grinding machine nearly got Italy in our black book. Manifestly useful for war production, the machine was shipped to Rumania from Italy.

Following investigation, W. Averell Harriman, Mutual Security director, reported this one machine would not add significantly to the Soviet war potential, that the machine had slipped through by accident, and that guarantees against further shipments of this kind had been received.

So President Truman, exercising his discretionary power, decided that "cessation of aid to Italy would be detrimental to the security of the United States."

As of late last week, NLRB and the Justice Department were still investigating charges by the steelworkers that the "big six" steel companies formed an illegal conspiracy to block single-company contract agreements with the union.

Machine Tool Policy Coming . . .

A long-term machine tool policy for the country is to be recommended to the Office of Defense Mobilization "early next fall" by the Advisory Committee on Production Equipment — informally known as the machine tool committee.

The report is to discuss these questions: How can productive capacity in excess of current needs best be created and maintained? What are the relative merits of financing production capacity in excess of current needs as against procuring reserve end-items without having capacity that approaches mobilization requirements? Is the present government organization for maintaining reserve production equipment and facilities adequate and what are the practical problems of operating high-capacity, low-production plants?

Roadblock Stretches On . . .

Although our roads are wearing out faster than they are being replaced, roadbuilding and maintenance expenditures in 1952 should aggregate only about $4 billion—comprising $2.5 billion new construction and $1.5 billion maintenance. The shrinking purchasing power of the dollar means purchase of about the same amount of real value this year as in recent years. Total highway expenditures in those years: $3.9 billion in 1951; $3.8 billion in 1950; $3.5 billion in 1949; $3 billion in 1948.

Outlook for 1953 is about the same as for 1952. Whether the amount of work done in 1954 and 1955 will be larger is conjectural. Seeking to avert an intolerable situation in the near future, the American Road Builders Association led a movement to sell Congress on a $3 billion-a-year program which would have resulted in raising total highway expenditures to $6 billion a year. The question that prevented Congress from buying was: Where will we get the money?

The answer to the dilemma may be privately-financed toll roads. Already expenditures of private funds for roadbuilding have reached sizeable proportions. Here are the figures: Cost of toll roads completed and in operation, $606 million; cost of toll roads now under construction, $538 million; estimated cost of toll roads authorized for construction, $961 million.

The whole situation is of more than passing interest to the metal and metalworking industries. Out of every $100 spent on highway work, $18 goes for machinery and equipment. For every $100 million of highway work, 214 million pounds of steel— for bridges, concrete reinforcing bars and mesh, and for roadbuilding machinery and equipment—are consumed.

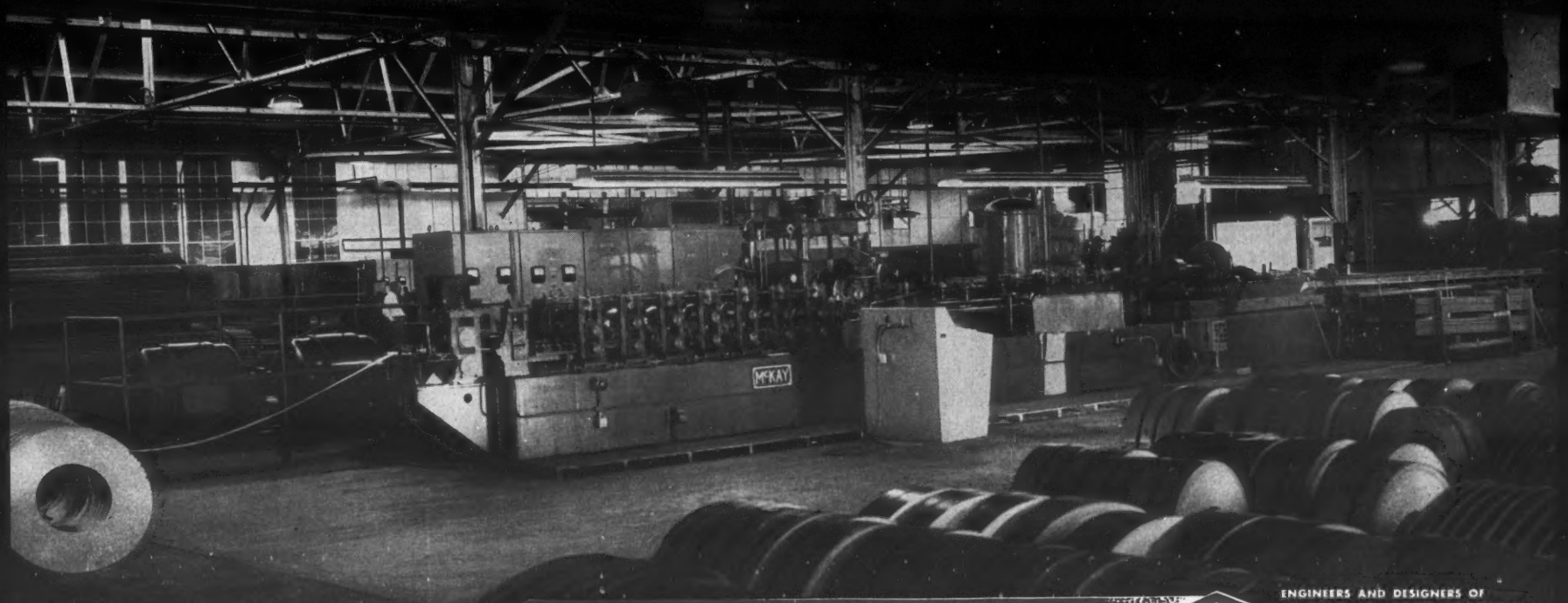
WALKER BROTHERS, of CONSHOHOCKEN, producing millions of feet of conduit on McKay tube mills, has proven conclusively that they can

McKAY

WALKER BROTHERS, of CONSHOHOCKEN, PA., have earned their reputation as manufacturers of quality conduit and electrical raceway tubing through years of serving the electrical industry. To maintain this position, it requires constant and rigid inspection—an alertness to new methods and the use of quality equipment.

McKAY is proud to have had their tube mills selected by WALKER. Experience gained after producing millions of feet of conduit on McKay tube mills, has proven conclusively that they can rely on McKay equipment to maintain their high standard of quality and keep pace with the ever increasing volume demanded by industry.

If your product is tubing it will pay you to investigate McKay equipment for greater yield—higher quality product — lower maintenance — and less down time.



The McKay RS-525-150 KVA Electric Weld

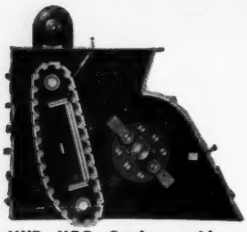
ENGINEERS AND DESIGNERS OF EQUIPMENT FOR THE AUTOMOTIVE, FABRICATING AND STEEL INDUSTR

McK

The McKAY MACHINE Company

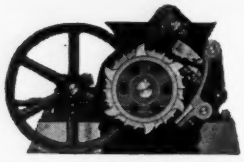
YOUNGSTOWN, OHIO

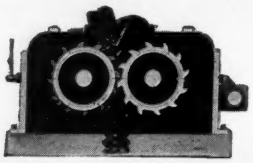
ASSOCIATED WITH WEAN ENGINEERING CO., IN

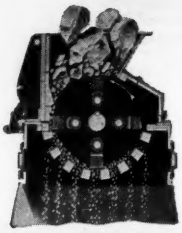


MUD HOG Crushers with traveling breaker plate

Single Roll, Double Roll and FLEXROLL Crushers







MIRACLE HAMMER Crushers for large capacities — large feed

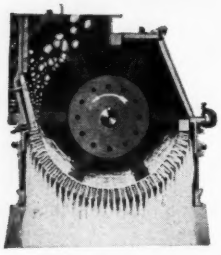
HIGH CAPACITY UNIFORM REDUCTION

A Complete Line of crushers, pulverizers, shredders for reducing all classes of material to desired size. Several types are shown.

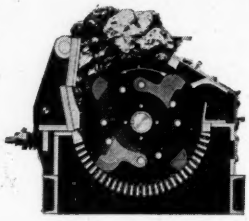
Built for specific applications — in a wide range of sizes — some with metal catchers — to suit capacity requirements.

Our modern test laboratory enables us to determine the proper type and size of machine best suited to the need in advance of expenditure or installation. Sample of material may be furnished, if desired, with results kept in strict confidence.

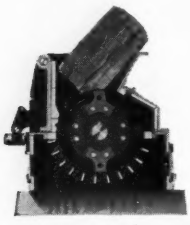
CRUSHER DIVISION



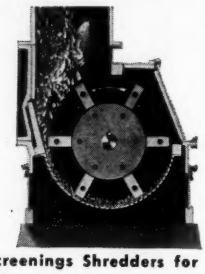
Type A Crusher with swing hammers



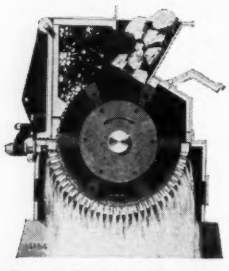
FLEXTOOTH and Rotary Ring Crushers



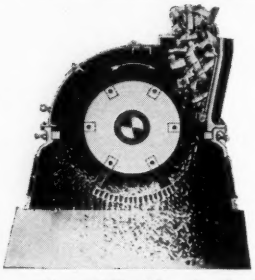
Bale Breakers, Pulp Lap and Crude Rubber Shredders



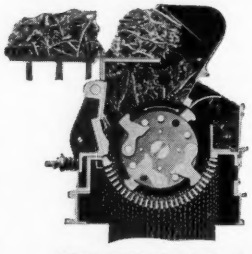
Screenings Shredders for chips, sewage, etc.



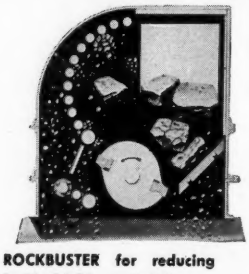
Type B Crusher with swing hammers



Type E Shredders for food or wood products



FLEXTOOTH Metal Turnings Crushers



ROCKBUSTER for reducing hard, friable material

THE JEFFREY MANUFACTURING COMPANY

1877 1952

883 North Fourth St., Columbus 16, Ohio

Baltimore 2 Boston 16 Cincinnati 2 Detroit 13 Houston 2 New York 7 St. Louis 1
Buckhey, W. Va. Buffalo 2 Cleveland 15 Forty Fort, Pa. Jacksonville 2 Philadelphia 3 Salt Lake City 1
Birmingham 3 Chicago 1 Denver 2 Harlan, Ky. Milwaukee 2 Pittsburgh 22

Jeffrey Mfg. Co. Ltd., Montreal, Canada
British Jeffrey-Diamond Ltd., Wakefield, England
Jeffrey-Galion (Pty.) Ltd., Johannesburg, S. A.

The Galion Iron Works & Mfg. Co., Galion and Bucyrus, Ohio
Galion (Great Britain Ltd.), Wakefield, England
The Ohio Malleable Iron Co., Columbus, Ohio

Scientific Apparatus: Sales Still Climbing

Manufacturers of research and process control equipment expect only a temporary dip in sales even when defense requirements are relaxed

SCIENTIFIC APPARATUS makers—riding the crest of another war-born boom—are convinced they are in business in a big way no matter what happens to the present defense program.

Last year sales topped the $167 million level (see the chart) and manufacturers are practically unanimous in predictions of another record-setting year in 1952. "We think our volume will increase again in 1952," says Beckman Instruments Inc., South Pasadena, Calif. "We look to 1952 as a time in which increased demands will continue," says A. J. Griner Co., St. Louis. "The industry as a whole will probably wind up the year with about a 15 to 20 per cent increase in sales over 1951," says Harshaw Chemical Co., Harshaw Scientific Division, Cleveland.

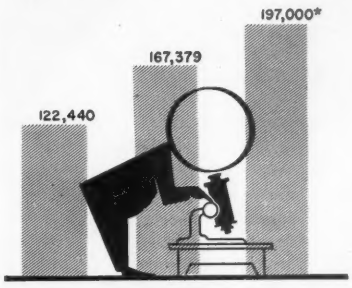
The instruments include optical instruments, like optical pyrometers, industrial instruments, like x-ray thickness gages and laboratory apparatus, such as surface analyzers.

Reason Why—Optimistic forecasts for sales of scientific instruments and apparatus after the wartime impetus fades are based on their increasing use within industry. Once familiar with scientific instruments for research and process control, the reasoning goes, industry will be unable to neglect them.

According to a survey by the Scientific Apparatus Makers Association, Chicago, industrial customers bought 50 per cent of the scientific instruments and laboratory apparatus sold in 1951. Educational institutions bought 23 per cent; federal, state and local government agencies bought 12 per cent; hospitals, 5.5 per cent; exports, 6.5 per cent and miscellaneous sales, 3.0 per cent.

Accelerated Growth — As a group industrial instruments are also the fastest growing segment of apparatus sales, though laboratory apparatus still accounts for larger total volumes.

While no laboratory is typical, one could be equipped for as little as a few hundred dollars or as much as several thousand dollars. Trends are toward some sort of research department in medium-to-large concerns and toward continuous-operating, direct-reading electronic process control instruments.



Scientific Apparatus

. . . sales are magnified

Thousands of Units

1950	
Laboratory apparatus	90,831,017
Optical instruments	10,377,801
Industrial instruments	21,231,525
Total	**122,440,343**
1951	
Laboratory apparatus	115,721,426
Optical instruments	12,512,343
Industrial instruments	39,146,145
Total	**167,379,914**
1952*	
Laboratory apparatus	133,110,000
Optical instruments	13,805,000
Industrial instruments	49,691,000
Total	**197,000,000**

* Estimated by STEEL

Not Very Long—How long will it take a completely civilian wave of scientific instrument buying to develop after the military buying ceases? "Just long enough," says Les Smith of Harshaw Scientific Division, "for manufacturers to discover that their competitors have not given up new product research or process control."

$2 Billion Rewiring Backlog

Home-wiring modernization holds a $2 billion backlog exclusive of $100 million additional business in new home construction, says Arthur R. Hines, commercial vice president of General Electric Co.

Addressing the 53rd session of the New York State Association of Electrical Contractors and Dealers, he pointed out that "the home which is not adequately wired will never be able to use the full complement of electrical equipment available and the potential market for appliances will be throttled.

Steel Export Demand Changes

Exports of iron and steel products in 1951 rose 14 per cent over the previous year, but the 3,277,000 tons shipped out of this country was the second lowest amount since 1939, says American Iron & Steel Institute.

Sharp changes in foreign imports of U. S. iron and steel products occurred during 1951.

While Canada and Mexico remained this country's largest customers, importing 1.2 million and 256,000 tons respectively, South America replaced Europe as the second largest continent customer. South America, received more than 588,000 tons in 1951, compared with less than 430,000 tons in 1950. Europe imported only 430,000 tons of iron and steel products in 1951. That's a drop of over 20 per cent from the tonnage Europe imported from the U. S. during the previous year.

Asia ranked fourth as a customer taking 407,000 tons, with more than 25 per cent of this total going to Iraq in the form of tube and pipes.

Africa and Oceana each imported about 120,000 tons of iron and steel products from the U. S. in 1951.

Tube Industry Boosts Capacity

Supply of welded and cold-drawn high-alloy carbon and stainless steel tubing, needed for the jet aircraft and atomic energy programs, will be increased. Shenango Agaloy Tube Co., Wheatland, Pa., is building a $3.5 million tube mill in that city for production of these products in a wide size range.

Don V. Sawhill, president of Shenango Agaloy Tube, Mercer Tube and Sawhill Manufacturing companies, turned the first spadeful of earth at the ground breaking ceremonies.

Training Can Cut Your Costs

Production is obtained from workers but through supervisors. Efficient supervision opens the door to high quality at low cost. The key: A training program

WITHIN four years Armco Steel Corp. expects to have saved $600,000 through its job methods program.

White Sewing Machine Corp. expects to save upwards to $40,000 yearly through its Job and Product Improvement plan.

A small metalworking operation saves an annual $1000 in its office budget through work simplification techniques.

Shadow and Substance — The genie responsible for recovering those industrial treasures is training.

Progressive executives who find that training counsels can be successfully teamed with their own management, burnish their training lamp bright and swear by the accomplishments of their industrial helper. Says one: "Training is as much a tool of production as a drill press or a turret lathe. The difficulty in training is not in its theories (most training principles have ready acceptance, few training techniques are not already manualized), the trouble comes in selling a program and then *applying* it. There is no easy way to do it. It's a full-time but highly productive job."

". . . And the task of training probably cannot be delegated," adds Lowell O. Mellen, president of Training Within Industry Inc., Cleveland. "Each person's boss is perhaps in the best position to train him. . The problem is simply one of training him to train others. When he knows how, it is easy; and he does it."

Easy Stages—How does a company set up a training program? "First," says the training director of a big utility, "there must be a need. Then the need must be determined specifically. Ways of finding out what the need is: Opinion surveys, supervisors' meetings." Mr. Mellen of TWI says the way to do it is to spot production problems.

All training directors agree that top management must be sold on the idea, must take the time to understand the need. Once management is sold on the need for training (it may demur almost immediately because it believes operating time will be cut—actually a good training program will increase production), management must stay sold on the idea.

Who should be training director? Management consultants recommend that he be chosen from among personnel already with the company. And he should have the qualifications listed below.

Training Director Qualifications

He must be well liked by almost everyone.
He must be able to get along with all kinds of people.
He should know the company's policies and personnel.
He should have or be able to get a wide knowledge of the company's operations.
He should have teaching ability (accent on adult education).
He should be willing to spend more than a normal working day at his job.

How can a training director be found? Usually through the selection of supervisors or management personnel in a position to know and judge fairly his qualifications.

Help Wanted—Where can he get help? Assistance in preparing a training director in carrying out a training program may be obtained from management consultants like Training Within Industry Inc., from the training departments of big companies (Bell Telephone, Western Electric, etc.), from universities (Purdue has a Program Exchange Service, Western Reserve has a Training Co-ordinators Institute), from training director associations (address the American Society of Training Directors in care of R. L. Moberly, secretary-treasurer, 2020 University Ave., Madison 5, Wis.).

Organizations like TWI perform the training function on a company-tailored basis. TWI works with a qualified company employee in setting up a simple basic pattern that is executed by the in-plant supervisors and managers.

Case Study—What happens in a typical training program? TWI cites the example of a large stoker manufacturer operating a defense job at only 65 per cent of a factory standard. Its management reviewed the situation, called TWI. Using TWI methods they found supervisors within the departments were spending much of their time doing jobs not within their duties or responsibilities; machine oper-

RECOGNIZE at all times that you are supervising people.

WHEN YOU THINK in terms of people, always remember the whole man is your concern. You are not dealing with a workman or a mechanic but with a human being whose emotions, purposes, prejudices, feelings, sympathies and ideals are part of his life on and off the job.

DO NOT by your words or acts contribute to employee dissatisfaction by sharp tongue, bad temper, poor planning or lack of fairness.

RECOGNIZE that there are two sides to every situation and that you don't know the whole story until you've heard the other side.

TAKE THE INITIATIVE yourself when something affecting them is wrong or unfair. If employees run to a union steward, if they make a grievance of everything, the supervisor is partly to blame because he is not on the job.

RECOGNIZE the importance of time and place in dealing with people. Pick the best time and place to give out good news or bad, criticize, deny or grant a request, give pats on the back.

BE WILLING to accept responsibility for your mistakes.

REMEMBER that when you are on the job you live in a glass house: People see more than you realize and then measure your actions rather than your words.

FORREST H. KIRKPATRICK, dean
Bethany College
Bethany, W. Va.

HOW TO GET READY

HAVE a timetable of how much skill you expect a man to have by what date.

BREAK DOWN the job by listing important steps, key points.

HAVE everything ready—the right equipment, materials.

ARRANGE the workplace properly—just as the worker will be expected to keep it.

HOW TO INSTRUCT

PREPARE the worker by putting him at ease. State the job and find out what he already knows about it. Get him interested in learning job. Place him in the correct position.

PRESENT the operation by telling about and illustrating one important step at a time. Stress each key point. Instruct only as much as can be easily mastered.

TRY OUT performance. Have the trainee do the job and correct his errors. Have him explain the key points as he does the job again. Continue until you know he knows.

FOLLOW UP training by putting the man on his own. Designate to whom he goes for help. Check frequently. Encourage questions. Taper off extra coaching and close follow-up.

LOWELL O. MELLEN, president
Training Within Industry Inc.
Cleveland

ators classified higher than their actual skills; a generally poor selective process for supervisors; tool breakage at an alltime high; hot weather slowing precision-tolerance work.

The facts were cited to the company's executive committee which immediately chose a company employee to work with the TWI training specialist. The company's training director worked with foremen for several weeks showing them how to break jobs down into a few "training" units. Foremen decided how many units or segments of the operation could be learned at one time. They picked out the key steps in various operations. With training men watching them closely, the foremen in turn instructed their workers. They were shown what made the job easier to do. Safety—not only to men but to machines and tools—was stressed. The defense job was soon rolling out close to the factory standard clip.

Obstacle Course—The task of convincing management of the need for a fullblown training program is no easy one. Accustomed as it is to the day-to-day grind of production, purchasing and selling problems, management often overlooks the need and importance of training its foremen and supervisors to be managers of their departments. But it has been getting more training conscious in the last several years. Today top-notch training directors are well employed. Average salary: $6,000.

To much of management, training is synonymous with formal education and bears a stigma of long-haired lectures, continual conferences, repetitive reports. Management, sold on the idea of budgets for advertising, market and technical research is not always sold on a budget for training. And to many, training is training new inductees, not the old-timers.

Tactful Technique—Overcoming supervisory and management resentment is a must in successful training. If top supervisors are trained to spot production problems, says TWI's Mellen, and lay out plans to meet them, they are forced to analyze the job for instruction purposes and thus for job classification and job evaluation. "It is surprising," says he, "how much rearranging supervisors will do before training anyone else."

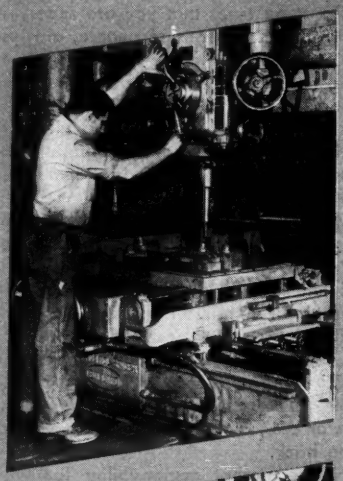
By-Products—After discovering that labor turnover had cost one company over $200,000 in 1951, one management consultant advised it to set up a first-rate training program and offer training instead of false upgrading as an incentive for keeping employees. The advice seems more productive than labor pirating in a depleted skilled-labor market.

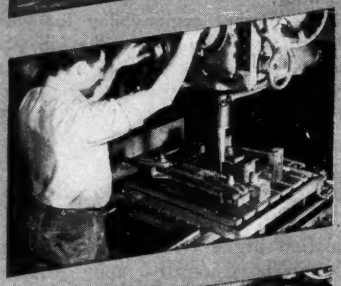
Another company's industrial relations man succeeded in getting a better union contract when he cited the high cost of handling grievances. Union officials were as susceptible as management to facts and figures citing chapter and verse on the expensive grievance procedure. The industrial relations man had only applied the techniques he had learned in the company's training program to his labor difficulty.

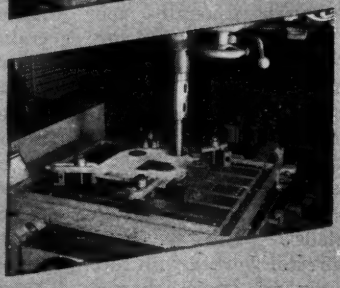
In analyzing one job during the beginning of its training program, a machine tool builder discovered that an intricate cam that had been discontinued for years was responsible for a major bottleneck.

Summing up the matter of training, one training director put it this way: "Training must be continuous. Put a training director on your payroll and keep him there."

BULLARD SPACER







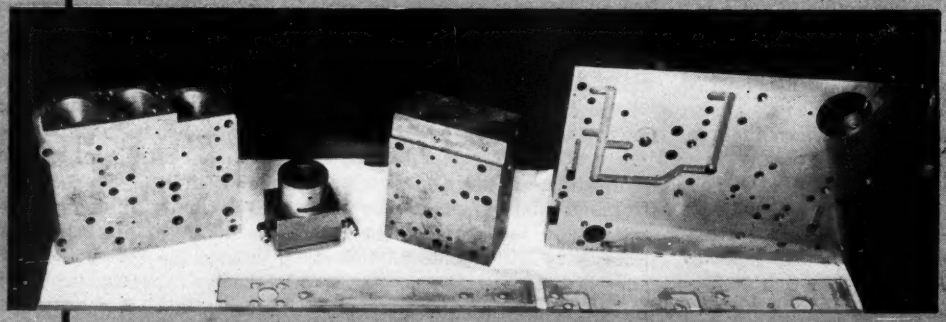
Norton Company, Grinding Machine Division

is obtaining important advantages from use of 4 BULLARD SPACERS on intricate drilling, reaming and tapping jobs.

Among the benefits received is a marked reduction in Operator fatigue. This is especially pronounced in overtime operation.

NORTON COMPANY has also found that with incentive time allowances, jig work Operators' efficiency is regularly held at 90% to 125%, while that of their Operators on BULLARD SPACERS runs 115% to 150%.

Ask for your copy of "The Norton Story"



THE BULLARD COMPANY

BRIDGEPORT 2, CONNECTICUT

By H. C. TUTTLE *Detroit Editor*

Mirrors of Motordom

Watch for some of the major automakers to make a bid for the sports-car market. Buick is furthest along, with its Skylark which would be semi-mass produced

DETROIT

MEN with ears attuned to the auto-buying public believe they detect the desire for a new kind of American car.

They look at the MGs, Jaguars, Allards around them; they see the growth of an entirely new industry devoting itself to "speed" equipment, from chrome plated acorn nuts for cylinder heads to Hollywood muffler extensions; they hear dissatisfaction of pseudo "authorities" with mass-produced cars; and they wonder if maybe it isn't time for them to reach out and grab the brass ring on the sports-car merry-go-round.

Psychology — It is recognized that distinctiveness is what many people seek, but they want a foreign car not because it's "hot" or "sharp" but because it's foreign. It is believed that the bulk of the sports-car minded are not themselves interested in car racing but are of the spectator-sport variety. And it is thought that within limits the price tag is of relatively little concern.

The exhibition and experimental cars which many automakers made by hand have had lots of impact on the American public and each maker has turned down fabulous offers for these vehicles. The next step now is to see whether the sportsman will put up or shut up when he has a chance to buy one.

Buick Prepares—The U. S. autobuilder generally conceded to already have the sportiest car in the works is Buick. It's following plans to pretest a newly designed five or six passenger convertible to see whether the demand is all it's cracked up to be. Buick began its pretesting by driving the car up to the entrance of the Detroit Athletic Club last week. Reaction at this likely spot was enthusiastic but more than DACers will be sounded out before Buick makes its decision to produce or not.

Auto, Truck Output

U. S. and Canada

	1952	1951
January	409,406	645,688
February	467,691	658,918
March	517,207	792,550
April	576,505	680,281
May	546,602	695,898
June	541,134*	653,682
July	.....	522,858
August	.....	571,442
September	.....	505,758
October	.....	558,971
November	.....	480,199
December	.....	402,729
Total	.....	7,179,161
Week Ended	1952	1951
June 7	128,807	152,656
June 14	130,544	157,026
June 21	129,574	158,909
June 28	124,337	156,105
July 5	87,052	98,087
July 12	50,000*	117,747

Sources: Automotive Manufacturers Association, Ward's Automotive Reports. *Preliminary.

The car, christened Skylark, has definitely been designed with possibility for semi-mass-production. Though striking in appearance it is immediately identifiable as a Buick. It obtains its distinctiveness through some fairly simple devices. The doors are cut down three inches in height, the beltline, or door top, paralleling the slope of the standard Buick fenders and at good height for comfortable elbow resting. Wheel openings in the fenders have been enlarged to expose fully the chrome-plated wire racing wheels, an importation from Italy. It is the wheels above all else in the car, which to many observers "sets it off." Front and rear-end styling is standard-Buick although the trunk lid has a "fastener" line. Buick uses its "sweepspear" molding in a thinned down version.

Dollar Question—How much is the car going to cost—if produced? Probably only slightly more than the Roadmaster convertible. It is on a Roadmaster chassis and contains the Roadmaster's 170-hp engine. Special upholstery and changes like the lowered front seat will add something extra but it appears that the price conceivably could be in the $4000-$5000 range.

Packard Troubled by Costs

Packard, in studying its Pan American sports-car for its production potential, so far has been unable to lick the cost element. Its car is considerably different from production-line models and as yet the goal of approximately $5000-$7000 for this sporty design does not appear reachable.

Packard, incidentally, will have among other mechanical improvements in next year's model, a power assisted steering system which, it is understood, will be along the line of the Saginaw unit used this year in three General Motors cars. Reportedly to be supplied by Bendix, it will carry a price tag of a little under $200. The unit will differ from the Saginaw and Gemmer devices in its placement.

Chrysler Tries New Transmission

Chrysler engineers have developed a new torque converter unit for their six-cylinder cars which may spur other transmission designers toward a cost-saving feature—combining the engine oil system with the torque converter oil system. Announcing the development, J. A. O'Malley, Chrysler Division sales manager and vice president, said that the motorist need change oil only twice a year in normal driving and should be able to get along with 26 quarts for the period. Chrysler Division's engineers assert that because the engine is drawing on a larger quantity of oil, counting that circulating through the torque converter, the useful life of all the oil is significantly prolonged.

Combining the oil systems eliminates the need for a torque converter oil pump and sump. Oil in the converter is air-cooled by blades on the outside of the con-

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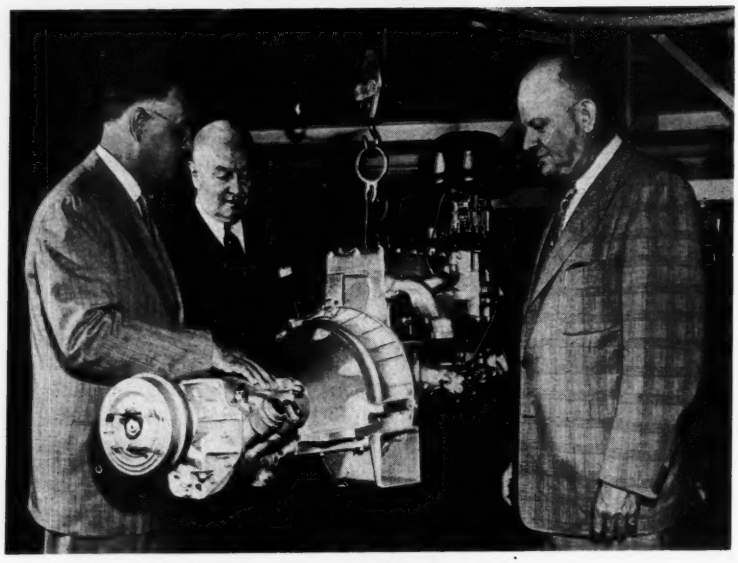


Something New Has Been Added

This torque converter is one of the first of the new, high-performance units designed for use with the 119-hp Spitfire engine used in Chrysler Windsor models. It's called "Fluid-Torque Drive." It is the first in the auto industry to have a combined oil system in which converter and engine use the same oil supply

verter shell, thus eliminating the need for separate oil coolers.

Introduced first in the Chrysler Windsor models, the new "Fluid-Torque Drive" teams up with the M-6 hydraulically operated transmission. It undoubtedly will be applied to six-cylinder DeSotos and later to Dodge sixes as an option. Plymouth too may ultimately get the unit.

Manual shifting is required with the new unit only to reverse or to disconnect the power train. A low gear range is obtainable through the transmission for heavy load conditions or engine braking. Still lacking, however, is a completely clutch-free transmission for Chrysler. Inability to get the required machine tools is the reason.

The Pinch Really Hurts

Asked what he had been using for autobody steel, one manufacturer gave (in slightly more pungent words) this explanation. "We're getting cold-rolled cowhides from Texas. If bulls aren't attracted to our cars, I'll be much surprised." Auto and truck production hasn't just faded away, it died suddenly, the Fourth of July being put as the time of expiration on most producers' death certificates, and malnutrition being listed as the cause.

Builders followed this course: They scrounged steel from all over the map. Chartered planes reportedly flew some in from Kaiser's mill in Fontana, suppliers surrendered their steel excesses to try to balance out production. Wide sheets were cut down for narrow parts in some plants and narrow strips were welded together for wide panels in others. The major auto plants still operating can probably be counted on one hand.

Dealers' stocks are figured to average only about 22 days supply at current buying rates, with the popular makes limited in many cases to only a few days' stock. Used car prices are in a rising trend, supporting the view that a real car shortage is coming.

Personnel Shifts at Ford, GM

Important personnel changes have been made at Ford and General Motors in positions of interest to the metalworking industries. Stanley W. Ostrander joins the ranks of Ford vice presidents, being named to head up the basic products group, which comprises the steel division, Dearborn General Manufacturing Division and the Manufacturing Services Division. Formerly operations manager of Lincoln-Mercury, Mr. Ostrander succeeds Logan C. Miller, who until his retirement will remain a vice president and will act as assistant to D. S. Harder, Ford vice president-manufacturing.

Mr. Ostrander came to Ford in 1948 as general manager of the Highland Park Plant and received his L-M appointment that same year.

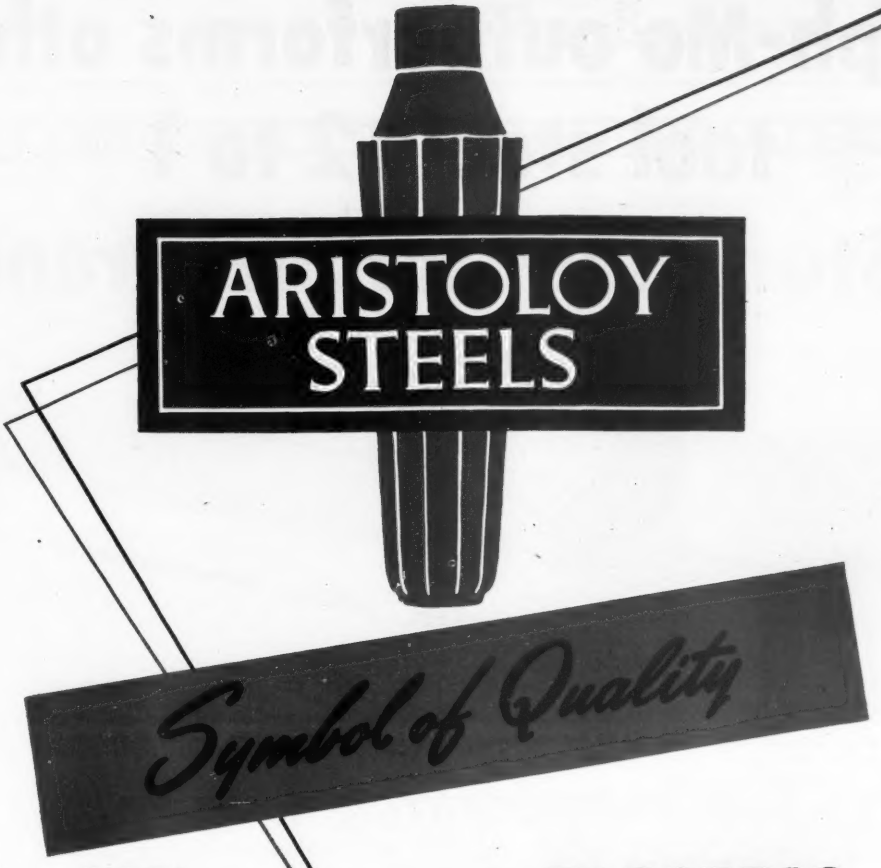
Across town, General Motors announced that two promotions in the research laboratories division had taken place. Named assistant technical director on the general manager's staff is John M. Campbell, and to succeed him as head of the organic chemistry department is Dr. Lloyd L. Witherow. Both have been intimately connected with high compression engine development and fuel and combustion research.

Maurice A. Thorne has been named engineer in charge of GM's engineering staff vehicle development group in a move which consolidates automotive ordnance and car development groups. The latter activity has previously been directed by Louis Thoms, deceased. R. V. Hutchinson and G. C. R. Kuiper are named as assistants to Mr. Thorne.

Three new plant managers have been appointed by Chevrolet Motors Division: Dale D. Douglass, formerly plant manager, Chevrolet-Oakland, Calif., assembly plant, to succeed J. L. Coyle, resigned, as manager of the Janesville, Wis., plant; J. D. Rhoades, previously shell division plant manager at St. Louis, to succeed Mr. Douglass in Oakland; and G. Swift, formerly general superintendent of the shell-making plant, to succeed Mr. Rhoades.

GMC Introduces Four Diesels

Four new Diesel-powered truck models have been introduced by GMC Truck & Coach Division of General Motors to permit carrying more payload in the same weight truck, give greater driver comfort and lower ton-mile costs. Three of the four models are six-wheelers, the fourth is of four-wheel design in the 21,000 gross weight vehicle class.



Hot Rolled
•
Forged
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Heat Treated
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Normalized Straightened
•
Cold Drawn
•
Machine Turned
•
Centerless Ground

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Chicago, Illinois

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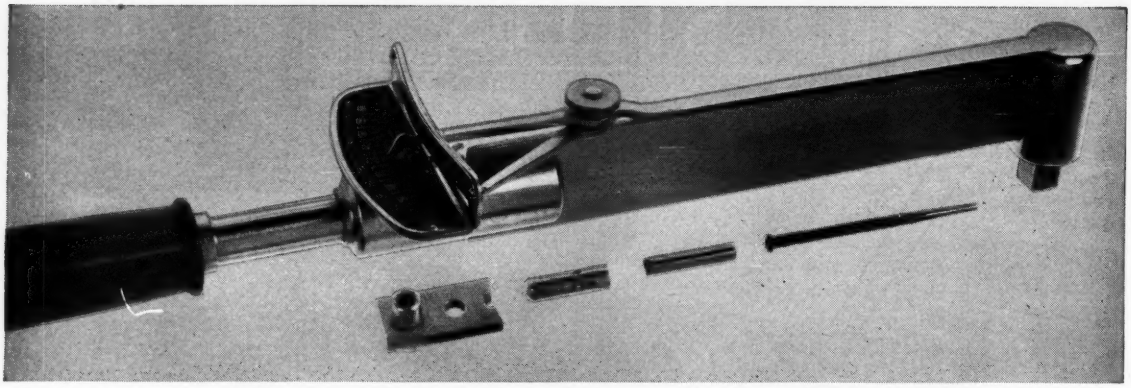
Graph-Mo outperforms other tool steels 2 to 1 in Sturtevant torque wrench



Top: Sturtevant torque wrench. Bottom: hammer latch stop rod, hammer latch, hammer return bushing, hammer made from Graph-Mo tool steel.

Cuts manufacturing costs, too!

IN the operation of the Sturtevant wrench, four of the component parts—hammer latch stop rod, hammer latch, hammer return bushing and hammer—are subjected to extreme abrasion and shock. Looking for a tougher, longer-wearing steel from which to make these parts, the Sturtevant Company tried Graph-Mo, one of four Timken® tool steels containing free graphite.

Used in the wrench under actual operating conditions, and tested in the laboratory, Graph-Mo tool steel was found by Sturtevant to resist shock and abrasion more than twice as well as all competitive materials. In a fatigue test, for example, a competitive tool steel fractured after 200,000 cycles, while Graph-Mo steel went more than 400,000 cycles and still did not fracture.

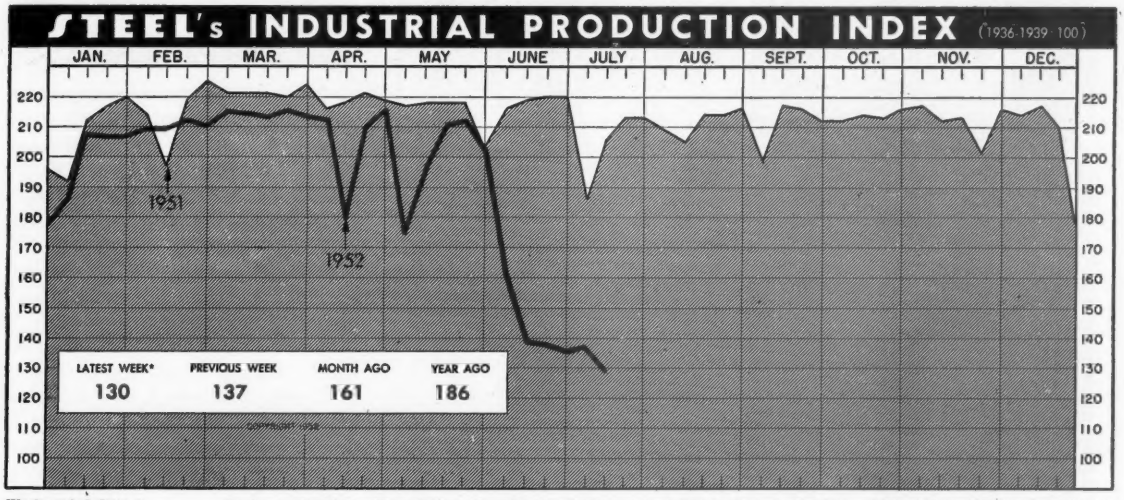
Graph-Mo steel also offered other advantages. It responded uniformly to heat treatment during manufacture, permitting close tolerances in the parts. And Graph-Mo steel's excellent machinability made possible faster production and lower manufacturing costs.

Timken graphitic tool steels are widely used in machine parts, dies, gauges and similar applications. The free graphite in the structure of Timken graphitic steel gives it outstanding low friction properties and makes for easy machining. The diamond hard carbides in graphitic steel offer stubborn resistance to wear and abrasion. For full information, write for enlarged 10th edition of the Timken Graphitic Steel Data Book. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING

The Business Trend



Week ended July 5

Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 20%.

Plant closedowns increase as more metalworking companies reach the bottom of the inventory barrel. Industrial activity index dips further during holiday week

JAWS of the steel strike were closing tightly on the nation, as the turnoff in steel production ended its sixth week.

Spreading—Until now, the steel famine seriously affected only steel-related industries and users of large amounts of steel. Among those particularly hard hit by the drop in steel production were the coal, automotive, heavy civilian-durables industries and the railroads. Now, the effects of the famine are spreading quickly.

Many metalworking companies are slowing down or halting production as they approach the end of their 45-day inventories of steel. This is true even among vital defense industries. The Office of Defense Mobilization says that slowdowns and halts are cropping up among many companies producing shells, tanks, jeeps, Army trucks and aircraft landing gear.

At present, there seems to be no method to escape this siege of production losses. It takes the steel industry ten days to two weeks to return to full operations, and by that time far more serious losses are expected. The steel strike has already brought unemployment to 1.2 million workers, on strike and laid off by the resulting steel shortages. This unemployment figure can only pyramid in the next few weeks as many more assembly lines come to a stop.

Index—With the impact of the steel strike gaining more force daily and with shutdowns for the Independence Day weekend STEEL's industrial activity index dropped 7 percentage points to 130 per cent of the 1936-1939 average in the week ended July 5. That's a decline of 81 points from the week ended May 24, the last full workweek before the strike, and 56 points under the same week, last year. Steel production edged up 0.5 of a percentage point in the week ended July 5, as auto-truck assemblies dropped severely. Freight car loadings and electric power generation also showed substantial declines in the week ended July 5.

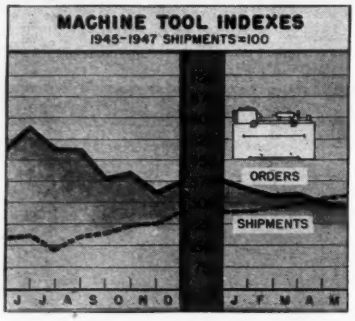
Steel Output Edges Up . . .

As some of the smaller steel companies started operations after signing with their unions, steel output edged up slightly last week. The nation's plants turned out 307,000 net tons of steel for ingots and castings in the week ended July 12, the American Iron & Steel Institute estimated. That's a rise of 30,000 net tons from the previous week and about 53,000 net tons more than the industry produced in the first week of the strike. Last week's 307,000-net-ton output marks a decline of 1,784,000 net tons from the pre-strike week ended June 1, when production totaled 2,091,000 tons of steel for ingots and castings.

Auto Output Trimmed . . .

As both the steel shortage and the Independence Day holiday trimmed operations, the U. S. automotive industry rang up a 35,700-unit production loss in the week ended July 5. When operations closed on July 3, the U. S. total reached only 80,550 car-truck completions. That's the lowest amount since Jan. 5, when New Year's Day and model changeovers held volume to 48,545 units, says *Ward's Automotive Reports*.

In the week ended July 5, U. S. and Canadian plants produced only 87,052 passenger cars and trucks, compared with 124,337 units in the previous week, and 98,087 autos and trucks in the same week last year. In the first half

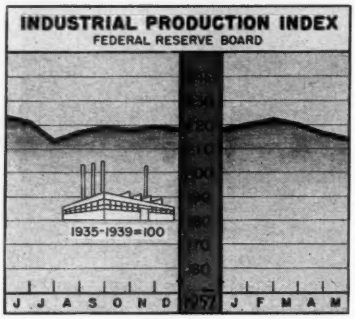


Machine Tool Indexes

1945-1947 Shipments=100

	New Orders		Shipments	
	1952	1951	1952	1951
Jan.	347.8	475.4	266.6	114.3
Feb.	318.8	615.5	279.6	123.8
Mar.	324.3	590.3	299.5	158.9
Apr.	293.5	516.1	307.9	157.7
May	286.3	483.0	322.3	175.1
June	....	558.8	....	182.8
July	....	490.6	....	144.7
Aug.	....	488.9	....	178.9
Sept.	....	380.2	....	189.8
Oct.	....	403.9	....	221.3
Nov.	....	330.5	....	226.0
Dec.	....	376.5	....	264.7

National Machine Tool Builders' Assn.

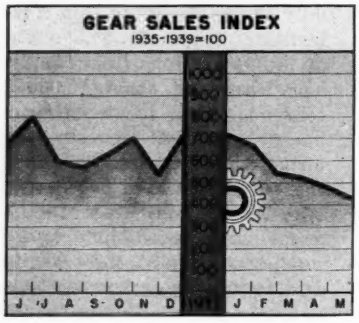


Industrial Production Index

1935-1939=100

	Total Production		Iron, Steel		Non-ferrous	
	1952	1951	1952	1951	1952	1951
Jan.	220	221	261	255	215	224
Feb.	222	221	261	252	217	218
Mar.	220	222	262	263	218	212
Apr.	216	223	245	264	219	210
May	214	223	245	263	217	206
June	...	221	...	261	...	204
July	...	213	...	253	...	198
Aug.	...	217	...	254	...	198
Sept.	...	219	...	257	...	201
Oct.	...	218	...	261	...	202
Nov.	...	219	...	261	...	209
Dec.	...	218	...	263	...	210
Avg.	...	220	...	259	...	207

Federal Reserve Board.

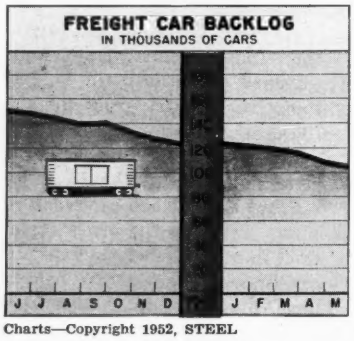


Gear Sales Index

1935-1939=100

	1952	1951	1950
Jan.	670.6	764.6	280.2
Feb.	539.5	809.1	272.9
Mar.	517.1	830.7	358.4
Apr.	478.7	742.5	328.6
May	425.9	667.1	363.1
June	....	800.9	401.0
July	....	589.1	410.7
Aug.	....	564.2	617.4
Sept.	....	630.1	654.5
Oct.	....	703.4	564.8
Nov.	....	530.0	554.9
Dec.	....	716.5	680.4

American Gear Mfrs. Assn.



Freight Car Awards and Backlogs

	Awards		Backlogs*	
	1952	1951	1952	1951
Jan.	5,338	26,356	120,251	144,758
Feb.	7,358	15,947	118,900	154,861
Mar.	5,619	11,271	115,854	158,619
Apr.	397	6,628	108,270	155,871
May	2,502	4,919	103,910	150,628
June	....	6,793	.....	147,725
July	....	2,417	.....	144,810
Aug.	....	1,828	.....	139,014
Sept.	....	9,657	.....	140,135
Oct.	....	3,464	.....	132,792
Nov.	....	6,752	.....	129,158
Dec.	....	3,309	.....	123,947
Total	....	96,190		

* End of month
American Railway Car Institute

Charts—Copyright 1952, STEEL

Issue Dates on other FACTS and FIGURES Published by STEEL

Construction .....June 9	Ironers .....July 7	Refrigerators .....June 16
Durable Goods ....June 23	Malleable Castings .June 2	Steel Castings .....June 2
Employ.,Metalwkg. June 23	Pumps .....June 30	Steel Forgings .....June 9
Employ., Steel ....Apr. 28	Prices, Consumer ..July 7	Steel Shipments ...June 23
Fab. Struc. Steel ..June 9	Prices, Wholesale ..July 7	Wages Metalwkg. ..June 23
Foundry Equip. ...June 9	Radio, TV .....June 16	Vacuum Cleaners ..June 30
Furnaces .....July 7	Ranges, Elec. .....June 16	Washers .....June 30
Gray Iron Castings.June 2	Ranges, Gas .....June 16	Water Heaters ....June 30

of 1952, combined U. S. and Canadian auto-truck production reached 3,055,926 units, compared with 4,141,518 car-truck assemblies during the first half of 1951.

Building Record Reached . . .

Outlays for new construction climbed to a record $15 billion in the first half of 1952, says the Commerce Department. That's about 4.2 per cent over the outlays during the same months last year when $14.3 billion was invested in construction.

Soaring industrial and military building was the main bulwark of the new record. Outlays for naval and military facilities increased 165 per cent over the first six months in 1951 to $788 million in 1952. And public industrial outlays rose 103 per cent to $732 million in the first six months this year.

But a decline developed in private outlays for new factories. Private industrial construction dropped 3 per cent over the year to $2.4 billion. Individual spending for private homes was down 8 per cent from last year. But second-quarter expenditures for new housing were almost as high this year as last.

Electric Power Strong . . .

Electric power generation is maintaining the high output reached in the earlier months of the year. Production of electric energy by electric utilities in May totaled 32 billion kilowatt hours, says the Federal Power Commission. This is the highest May total on record, exceeding by 6.5 per cent the generation in May, 1951, and by 1 per cent the 31.5 billion kilowatt hours produced in the preceding month.

Despite the steel strike's blow to industrial use of electric energy, electric power generation still maintained its new high level at the end of June. The electric light and power industry distributed 7.3 billion kilowatt hours in the week ended June 28, says Edison Electric Institute. That's about 6.1 per cent above generation in the same week, 1951. In the week ended June 28, all the major geographic regions showed in-

creases in generation over the year-ago output, except the Central Industrial Region where electricity consumption fell 0.6 of a percentage point due to the steel strike.

Radio Output Slides . . .

Radio production continued its downslide by dropping to 748,344 units in May. This compares with an April turnout of 847,946 units and a March output of 975,892 sets. During May, 1951, the industry produced nearly 1.4 million radios.

Makers of television sets—perhaps anticipating a demand upsurge before the party conventions—showed only slight production declines. The industry assembled 309,375 sets in May, compared with 322,878 sets in April and 339,132 TV sets produced in May, 1951.

Car Loadings To Drop . . .

Freight car loadings in the third quarter will drop about 1.2 per cent below loadings in the third quarter, 1951, estimates the Association of American Railroads after compiling estimates of the 13 shippers advisory boards. Third-quarter car loadings of the 32 basic commodity groups are gaged at 8.1 million, a decline of 98,000 under loadings in the third quarter last year.

High among the leading commodities for which substantial decreases are estimated are cotton and auto-truck loadings, with an expected decline in shipments of 16 and 15 per cent, respectively.

Reflecting production losses brought on by the steel strike, loadings of revenue freight totaled only 649,173 cars in the week ended June 28. That's a decrease of 21 per cent from the 821,615 cars loaded the same week, 1951.

Trends Fore and Aft . . .

Bank clearings reached an alltime high of $21,384 million in the week ended July 2 . . . Loans to metalworking companies increased $10 million in the week ended June 25. So far this year, these companies have borrowed over $1.1 billion . . . Class I railroads spent $271 million in the first quarter, 26 per cent above their gross capital expenditures in the same months in 1951 . . . Consumers prices hit an alltime high during May, says the National Industrial Conference Board . . . New orders for foundry equipment placed during May totaled $1 million in value, compared with $2.2 million placed in the same month, 1951.

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Output (per cent of capacity)[2]	12.5	12.0	101.0
Electric Power Distributed (million kwhr)	6,453	7,317	6,077
Bituminous Coal Output (daily av.—1000 tons)	1,445	1,313	1,747
Petroleum Production (daily av.—1000 bbl)	6,000[1]	6,153	6,169
Construction Volume (ENR—millions)	$223.2	$365.1	$404.7
Automobile, Truck Output (Ward's—units)	87,052	124,337	98,087
TRADE			
Freight Car Loadings (unit—1000 cars)	600[1]	649	588
Business Failures (Dun & Bradstreet, number)	131	163	129
Currency in Circulation (millions)[3]	$29,180	$28,814	$27,948
Dept. Store Sales (changes from year ago)[3]	+1%	+6%	0%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$21,384	$14,738	$18,828
Federal Gross Debt (billions)	$262.8	$258.5	$254.7
Bond Volume, NYSE (millions)	$13.2	$13.1	$10.2
Stocks Sales, NYSE (thousands of shares)	5,303	6,025	5,183
Loans and Investments (billions)[4]	$75.4	$75.0	$70.6
United States Gov't. Obligations Held (billions)[4]	$32.5	$32.4	$31.2
PRICES			
STEEL's Weighted Finished Steel Price Index[5]	171.92	171.92	171.92
STEEL's Nonferrous Metal Price Index[6]	224.6	222.8	226.0
All Commodities[7]	110.7	110.7	115.0
All Commodities Other Than Farm and Foods[7]	111.9	112.3	116.6

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1951, 1,999,035; 1952, 2,077,040. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100. [8]Not available.

A greater variety of fasteners and small parts that can be made faster, stronger and more economically by Pheoll's cold heading and roll threading methods. Cold working of wire stock often surpasses turning, casting, stamping, drawing or molding.

LOWER MATERIAL COST . . . Cold-heading results in much less scrap than in metal cutting operations, in fact in the production of most cold-headed parts there is little or no scrap.

LOWER PRODUCTION COST . . . due to high production rate. Cold-heading . . . entirely automatic, is not affected by operator skill, strength or fatigue.

LOWER DIE COST . . . Cold-heading dies cost less, even on more intricate sections, than for *any other forming operations.*

INCREASED TENSILE STRENGTH . . . Improved physical properties are imparted to all metallic fasteners by cold working.

GREATER TOUGHNESS and FATIGUE RESISTANCE . . . because grain flow of material is compacted and directed to follow contour of piece.

UNIFORMLY HIGH QUALITY PARTS . . . assured because cold working requires materials free from structural defects.

Single or multiple secondary operations can be performed on cold headed parts to produce special characteristics required to fit the part for its particular application. Such operations include drilling, tapping, milling, shaving, flattening, notching, flanging, trimming, bending, off-setting, slotting, fluting swaging, knurling, pointing, heat treating, plating and finishing—all in Pheoll's modern plant.

PHEOLL PROFIT PRODUCING FASTENERS

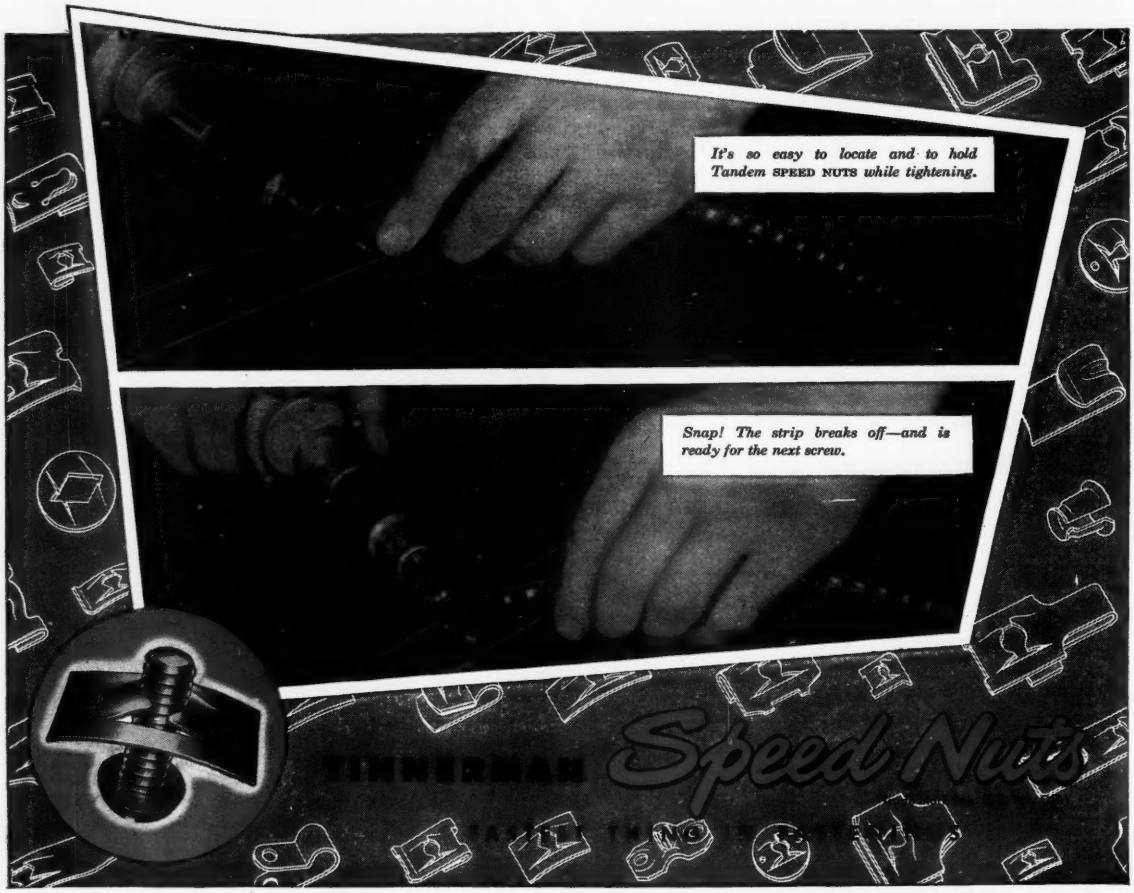
Machine Screws
Phillips Recessed Head Screws
Sems
Thread Cutting Screws
Tapping Screws
Cap Screws
Threaded Rods

Pheoll MANUFACTURING COMPANY
5700 ROOSEVELT ROAD
CHICAGO 50, ILLINOIS
SCREWS • BOLTS • NUTS

. . . the fasteners with a "handle", make huge savings with *lightning-fast* attachments!

This continuous strip, flat-type SPEED NUT is really a "speed demon" on the production line! It's so easy to use in assembly applications that present users call it the "SPEED NUT with the handle"! With the continuous strip in hand, the end SPEED NUT is always ready to be applied . . . as the screw is driven home, the nut is snapped off the strip with a quick snap-motion . . . and the operator moves to the next fastening point . . . ready to go in a split-second!

Production ideas like this, that speed up assembly time and *keep costs down*, are being developed constantly by Tinnerman engineers for fastening assemblies on all types of products. Whatever your fastening problems . . . turn to TINNERMAN for answers that save production costs for you! Your Tinnerman representative will be happy to supply detailed information on our FREE Fastening Analysis Service. Or write direct to: TINNERMAN PRODUCTS, INC., Dept. 12, Box 6688, Cleveland 1, O. In Canada: Dominion Fasteners Ltd., Hamilton. In Great Britain: Simmonds Aerocessories, Ltd., Treforest, Wales. In France: Aerocessoires Simmonds, S.A.—7 rue Henri Barbusse, Levallois (Seine) France.


It's so easy to locate and to hold Tandem SPEED NUTS *while tightening.*
Snap! The strip breaks off—and is ready for the next screw.
TINNERMAN
Speed Nuts

Men of Industry

RALPH M. WATSON
. . . directs research at Worthington

WILBUR J. SHENK JR.
. . . joins Paterson-Leitch

LIONEL Y. GREENE
. . . new president, General Refractories

Ralph M. Watson was named director of research, **Worthington Corp.**, Harrison, N. J., to succeed **Paul Diserens** who continues in a technical consulting capacity in engineering and research. **M. E. Ziegenhagen** becomes advertising and sales promotion manager.

Ralph A. Maxwell becomes director of purchases, **Foote Bros. Gear & Machine Corp.**, Chicago. He formerly was director of purchases, Sampsel Time Control Co.

Ian F. McRae was elected vice president of manufacturing, **Canadian General Electric Co. Ltd.**, Toronto, Ont.

Warren S. Mann is now manager, Dixie Division, **Armco Drainage & Metal Products Inc.**, with headquarters in Atlanta. He succeeds **Howard See**, retired.

John A. Goodwin was appointed general manager, **Morrison Engineering Corp.**, Cleveland. He previously was with Chase Brass & Copper Corp.

Wigton-Abbott Corp., Plainfield, N. J., promoted **Irwin Borsuk**, chief engineer, to director of engineering. He is succeeded by **W. V. Coleman.**

Albert L. Deatrick was appointed sales manager, **Magna Mill Products**, South Gate, Calif.

Kaynar Co., Los Angeles, appointed **F. R. Lewis** sales manager of its aircraft parts division.

Wilbur J. Shenk Jr. joined **Paterson-Leitch Co.**, Cleveland, as assistant treasurer. He formerly was with Harshaw Chemical Co.

Herbert Luke was elected executive vice president, **Sy Lawrence** vice president, **R. P. Evans** vice president-purchases and **Harry Blenner** sales manager, **Interstate Steel Co.**, Evanston, Ill.

H. A. Martin was appointed engineering and production director, **Caldwell Industries Inc.**, Kent, O. He rejoins the company which he previously served from 1947 to 1950 as production manager. For the last two years he was with Clark Cable Corp.

Richard J. Schumann was named vice president in charge of manufacturing at the Dayton, O., plant of Airtemp Division, **Chrysler Corp.**

Walter C. Smart was appointed general sales manager, motor vehicle division, **Twin Coach Co.**, Kent, O. **G. J. Felton** becomes manager, service replacement parts division and **R. W. Jones** field service manager.

Hooker Electrochemical Co. transferred **John T. Walmsley** and **Frederick W. Bonacher Jr.**, chemical engineers, to the sales co-ordination office, sales department, at Niagara Falls, N. Y. **John P. Edwards** and **Carl Gochenour** were transferred from development and research department to the sales department.

Lionel Y. Greene was elected president, **General Refractories Co.**, Philadelphia. **Floyd L. Greene**, president since 1937, becomes chairman of the board and remains the senior executive officer of the company and its subsidiaries. Mr. Greene, the new president, had been vice president since 1936, and in 1948 was made executive vice president.

George N. Decker was appointed vice president, Kellogg Division, **American Brake Shoe Co.**, Rochester, N. Y. He continues as division controller.

R. B. Devine was promoted to sales manager, **B. Greening Wire Co. Ltd.**, Hamilton, Ont., succeeding **C. H. Carnahan**, retired.

Emergency Steel Service Corp., Skokie, Ill., appointed **Ralph C. Herdrich** director of purchases.

Bernard Pratte was appointed general sales manager, **Harnischfeger Corp.**, Milwaukee, supervising all domestic divisions in Milwaukee except welding products. He also heads domestic branch offices except those of the company's Pacific division. He has been Pittsburgh district sales manager since 1946.

Standard Pressed Steel Co., Jenkintown, Pa., named additional sales representatives to handle its socket screws and its standard products: **Marshel Moorehouse** was assigned the New York territory;

Walter H. Cunnington works out of St. Louis and **James C. Humphries** will have headquarters in Los Angeles.

Raymond A. Rich was named vice president, refrigeration division, **Philco Corp.**, Philadelphia, responsible for development and pricing of products. **Harold W. Schaefer** was named vice president of engineering for the division.

Nelson H. Stewart was made staff assistant to the sales manager, Electronic Tube Division, Elmira, N. Y., **Westinghouse Electric Corp. Charles F. Trapp** was appointed area manager of the Detroit branch office of the company. **C. Spence Purnell** becomes eastern district manager, electric utility department and **George C. Brown** assistant manager, New York. Mr. Purnell succeeds **John Spraggon**, on a year's assignment with NPA in Washington.

Cutler-Hammer Inc., Milwaukee, appointed **F. C. McNicol** division manager for industrial control sales and **R. R. Smith** for renewal parts sales.

Vincent Anson becomes regional sales manager for **Nesco Inc.'s** southwest district. He will be located in St. Louis. **Donald J. Devereaux** resigned as general manager, stove and heater division, to operate a manufacturing agency in the South.

Carl S. Abbott was appointed vice president and general manager and **John W. Fauver** vice president and sales manager, **J. N. Fauver Co. Inc.**, Detroit. Mr. Abbott was formerly sales manager and Mr. Fauver was in ordnance department.

P. M. BUHRER
. . . National Carbon exec. V. P.

C. O. KLEINSMITH
. . . National Carbon exec. V. P.

P. M. Buhrer and **C. O. Kleinsmith** were appointed executive vice presidents of **National Carbon Co.**, a division of Union Carbide & Carbon Corp., New York. Both have been with National Carbon for many years, Mr. Buhrer with research and development activities and Mr. Kleinsmith with sales.

Thomas A. Stratford assumes the newly created post of assistant manager, product development and advertising, **American Welding & Mfg. Co.**, Warren, O.

William M. Frame was appointed executive assistant, operating department, **National Tube Division**, U. S. Steel Co., Pittsburgh. He has recently been vice president and works manager, Kerotest Mfg. Co. For a number of years he was with Spang-Chalfant Co.

J. W. Bostwick, long associated with the refrigeration and air conditioning industry, joined **McCray Refrigerator Co. Inc.**, Kendallville, Ind., as general sales manager. **R. E. Abbott**, vice president-sales, was elected vice president of operations. **W. V. Herr** was named general credit manager and treasurer.

Charles D. Townsend was appointed director of manufacturing, **La Pointe-Plascomold Corp.**, Rockville, Conn.

John H. Johnson is now purchasing agent at **Crompton & Knowles Loom Works**, Worcester, Mass., succeeding **Frank E. Colesworthy**, retired.

Milton H. Gardner was named assistant general sales manager, **Electro-Motive Division**, General Motors Corp., La Grange, Ill. **G. C. Mikelson** is sales representative in the Chicago region.

Smith Engineering Works, Milwaukee, appointed **A. L. Munro** as engineering director and **Elmer E. Kraig** chief engineer.

Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y., named **W. U. Cigliano** assistant general manager, **Russell Hoehl** assistant district manager at Philadelphia, and **Vernon Paulson** an assistant western sales manager at Chicago.

Shell Chemical Corp. appointed **D. F. Bradley** manager of its Detroit district sales office to succeed **W. E. Keegan**, now assistant to the vice president, marketing.

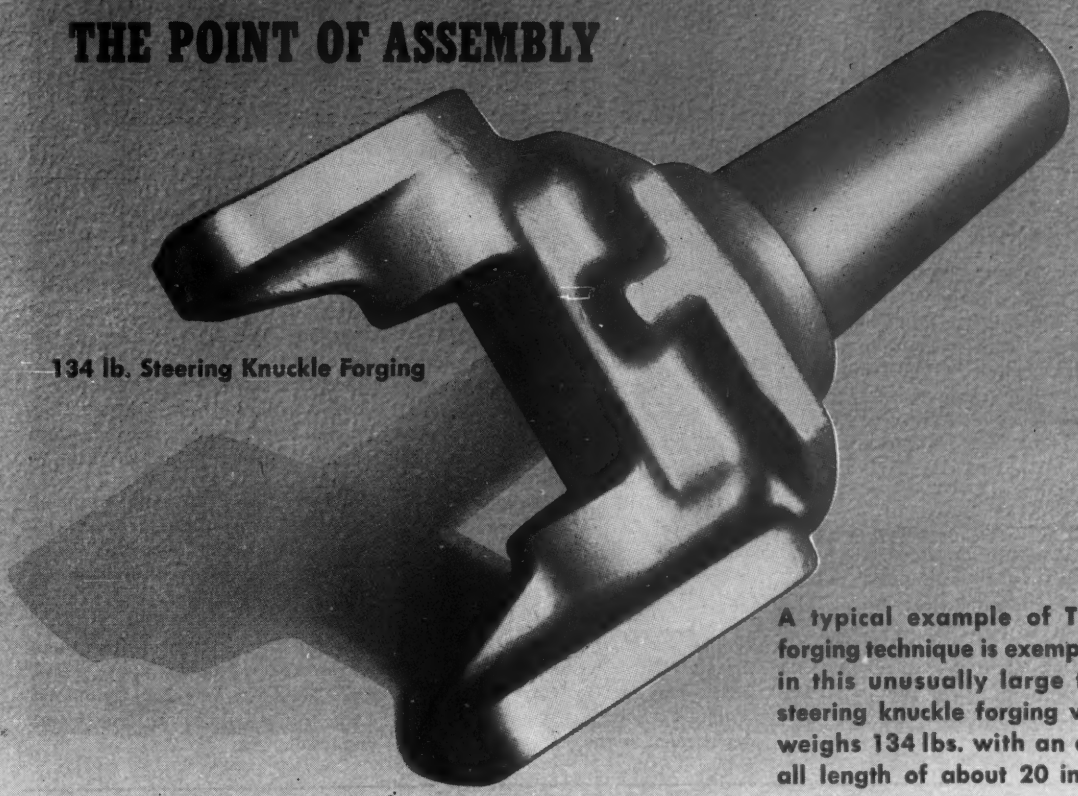
General Controls Co., Glendale, Calif., appointed **Russell Strongman** manager of its branch office in New York. He formerly was

CARL S. ABBOTT
. . . Fauver V. P.-gen. mgr.

JOHN W. FAUVER
. . . Fauver V. P.-sales mgr.

TRANSUE FORGINGS

USUALLY COST LESS AT THE POINT OF ASSEMBLY



134 lb. Steering Knuckle Forging

A typical example of T & W forging technique is exemplified in this unusually large truck steering knuckle forging which weighs 134 lbs. with an overall length of about 20 inches.

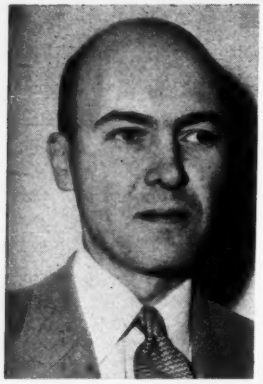
Consult our engineers when you are contemplating conversion to forgings or when you are in need of reliable forging service.

TRANSUE & WILLIAMS

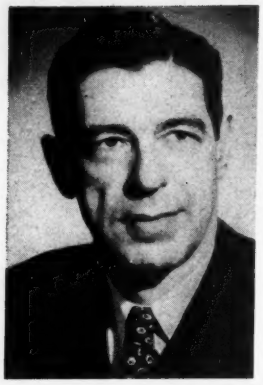
STEEL FORGING CORPORATION • ALLIANCE, OHIO

SALES OFFICES: NEW YORK • PHILADELPHIA • CHICAGO • INDIANAPOLIS • DETROIT • CLEVELAND

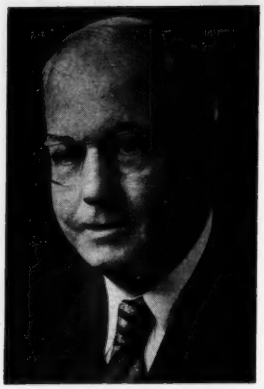
OVER 50 YEARS OF FORGING PRODUCTION EXPERIENCE



J. ALLAN WICKETT
. . . chief metallurgist, Brillion Iron Wks.



R. S. STEVENSON
. . . executive V. P. of Allis-Chalmers



DUNCAN A. BLACK
. . . manages divisions at Blaw-Knox

manager of Automatic Controls Co., subsidiary.

J. Allan Wickett was named chief metallurgist, **Brillion Iron Works Inc.**, Brillion, Wis. He has been associated with Canadian and American foundries for a number of years and most recently was with Monsanto Chemical Co., Springfield, Mass., working on resin corebinders and shell molding.

H. H. Heath was appointed comptroller and **Gordon Robertson** assistant comptroller, Baroid Sales Division, **National Lead Co.**, New York.

Nelson H. Mageoch was appointed chief engineer, **Daystrom Instrument Division**, Daystrom Inc., at Archbald, Pa.

Allis-Chalmers Mfg. Co., Milwaukee, elected **R. S. Stevenson** executive vice president. He is succeeded by **Willis G. Scholl** as vice president in charge of the tractor division. **Frank Mussell**, eastern territory manager of the division, succeeds Mr. Scholl as vice president and general sales manager, tractor division.

Edward B. Blanc was named sales engineer, Drill Steel Division, **Crucible Steel Co. of America**, Pittsburgh. He will serve customers in the eastern half of the United States.

Hugh C. Seeley assumes the position of sales-service supervisor, **Baker-Raulang Co.**, Cleveland, and **Walter E. Schoch** becomes service department manager.

Blaw-Knox Co. appointed **Duncan A. Black** manager of its newly combined power piping and sprinkler divisions. He joined Power Piping Co. in 1926 and continued with the organization when it became part of Blaw-Knox in 1937. Since 1949 he has been vice president of Blaw-Knox Construction Co., a subsidiary, and assistant manager, power piping division.

Edgcomb Steel of New England Inc., Milford, Conn., appointed **David B. Curran** assistant manager of its fastener division in Nashua, N. H.

William Engs will head operations as manager of two Niagara Falls, Ont., plants of **American Cyanamid Ltd.** and its limestone quarry at Ingersoll, Ont.

OBITUARIES...

Karl W. Gass, 64, engineering vice president, **Amsler Morton Corp.**, Pittsburgh, died July 2.

Percy S. Fassett, 64, sales manager of the Rochester, N. Y., branch of **Yawman & Erbe Mfg. Co.**, died June 27.

Donald B. Clark, 55, vice president of sales, **Perkins Machine & Gear Co.**, West Springfield, Mass., died July 5.

Julius H. Peters, 62, formerly secretary, **Colonial Iron Works Co.**, Cleveland, and since 1950 president, **Leader Iron Works Co.**, Decatur, Ill., died July 5.

William E. Clement, 63, for more than 20 years an official, **Swartwout Co.**, Cleveland, and secretary-treasurer, died July 6.

Gerald J. Weckmueller, assistant superintendent of blast furnaces, **Indiana Harbor Works** of Inland Steel Co., Chicago, died June 5.

Charles H. Springer, proprietor of **Springer Welding Works**, Albany, N. Y., died July 2.

Frank J. Quigan, 62, former chairman, **Fedders-Quigan Corp.**, Buffalo, died July 8.

Stanley A. Daniels, 73, for 18 years roll superintendent at the Otis Works, Cleveland, of **Jones & Laughlin Steel Corp.**, died July 8. He retired in 1951.

Clarence D. Holland, with **Youngstown Sheet & Tube Co.** for more than 25 years, and resident salesman at Charlotte, N. C., died June. 28.

George J. Sebastian, 77, president, **American Nickel Works**, Chicago, died July 2.

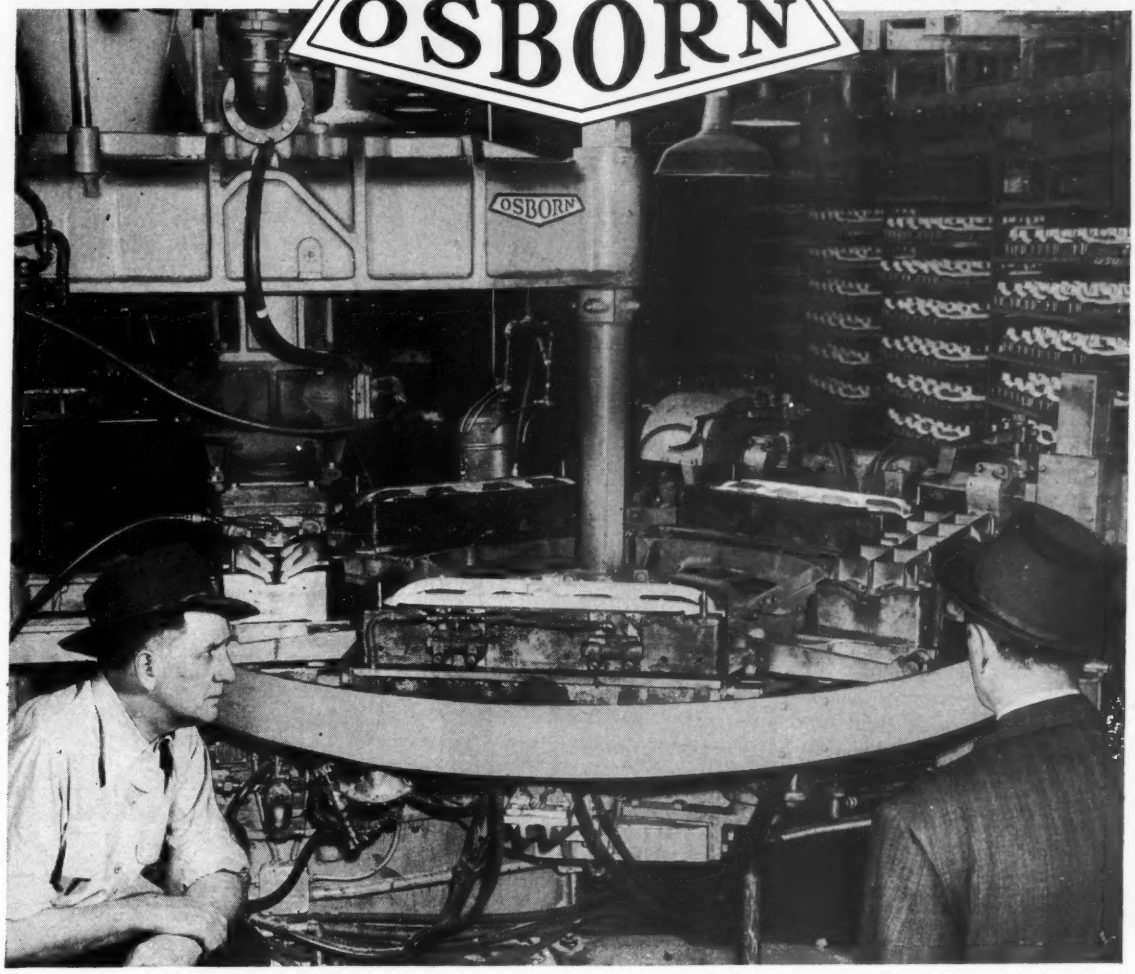
George J. Gordon, 56, a partner in **Gordon Bros. Iron & Metal Co.**, Chicago, died July 3.

Ralph B. Jones, 56, sales service manager, **Osborn Mfg. Co.**, Cleveland, died July 6.

Edward H. Worth, 71, chairman, **Worth Steel Co.**, Claymont, Del., at time of its absorption by Colorado Fuel & Iron Corp., died July 7.

Louis C. Boehnen, vice president and one of the founders of **Boehnen Tool Co.**, Cleveland, died July 8.

OSBORN



This "automatic" idea by OSBORN can cut your foundry core costs!

Cuts costs over 60%. This Osborn "Roto-Core Automatic" makes sand cores many times faster than was possible before. It operates automatically on a repetitive time cycle that can be preset for any type of work. The result is more output per man-hour . . . uniform production of high-quality cores with less operator training than required with other methods.

This advanced idea in automatic core blowing is another example of what Osborn is doing to mechanize the production of molds and cores. In our complete line there is a right size and type of molding machine and core blower for every essential foundry requirement. Many types are equipped with mechanical devices to eliminate heavy manual effort . . . many have automatic controls to insure uniform output hour after hour.

Consult Osborn. Learn what advanced developments, from 60 years of experience in the foundry industry, can be applied to increase your foundry efficiency and cut costs. An Osborn factory-trained foundry molding analyst will gladly survey your needs and recommend the correct equipment. Call or write *The Osborn Manufacturing Company, Dept. 778, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

Serving the Foundry Industry for Over 60 Years

Osborn Molding Machines

MOLDING MACHINES . . . CORE BLOWERS . . . INDUSTRIAL BRUSHES

COST COMPARATOR

Springtites and Sems vs. Old Methods of Fastening

(From pages 4 and 5 of Eaton Springtites and Sems Engineering Bulletin S-49)

To figure savings you can make with Eaton Springtites or Sems:

(1) Determine average number of washers and bolts your worker can assemble in one hour.
(2) Find assembly cost per thousand at hourly labor rate paid in chart below.
(3) Add overhead based on direct labor to get total labor cost of hand assembly.
(4) Add cost of unassembled bolts and washers.
(5) Deduct cost of Eaton Springtites and Sems.

ASSEMBLY COST PER THOUSAND

Pieces Assembled per hour	HOURLY LABOR RATE $0.75	$1.00	$1.25	$1.50	$1.75	$2.00
500	$1.50	$2.00	$2.50	$3.00	$3.50	$4.00
550	1.36	1.82	2.27	2.73	3.18	3.64
600	1.25	1.67	2.08	2.50	2.92	3.33
650	1.15	1.54	1.92	2.31	2.69	3.08
700	1.07	1.43	1.79	2.14	2.50	2.86
750	1.00	1.33	1.67	2.00	2.33	2.67
800	.94	1.25	1.56	1.88	2.19	2.50
850	.88	1.18	1.47	1.77	2.06	2.35
900	.83	1.11	1.39	1.67	1.94	2.22
950	.79	1.05	1.32	1.58	1.84	2.11
1000	.75	1.00	1.25	1.50	1.75	2.00

Cost of Labor (from chart above) $_____
Overhead on Direct Labor _____
Total Labor Cost $_____
Cost of Unassembled Screws or Bolts _____
Cost of Unassembled Washers _____
Total Parts Cost $_____
Total Parts and Labor Cost $_____
Cost of Eaton-Springtites or Sems (deduct) $_____
SAVING $_____

*Springtites

Quality Reliance Spring Lock Washers of proper size and weight pre-assembled on bolts or screws ready for the assembly.

†Sems

Same as Springtites but with multi-prong washers of any type instead of spring lock washers.

YOU

can figure your own savings with EATON *Springtites** and *Sems*†

- Eaton Springtites and Sems cut assembly motions from 8 to 3.
- The saving is obvious — and especially important at today's high labor rates.
- You can get some idea of what it amounts to from the chart at the left.
- If you'd like to know what it would mean to you in dollars and cents, write your nearest Eaton-Reliance office for prices on your requirements.

PROMPT DELIVERY on standard sizes

EATON

EATON MANUFACTURING COMPANY

Springtites and SEMS

PRE-ASSEMBLED WITH ALL TYPES OF SCREWS AND WASHERS

RELIANCE DIVISION, MASSILLON, OHIO

Sales Offices: New York, Cleveland, Detroit, Chicago, St. Louis, San Francisco, Montreal
In Canada: Eaton Automotive Products, Ltd., London, Ontario

Production AND Engineering
NEWS AT A GLANCE

DESIGN CHANGE SAVES DOLLARS—By using low alloy steel tubes covered with a skin of Monel cladding as extensible radio and radar masts for snorkel subs, the Navy's Bureau of Ships expects to save taxpayers something over $2,500,000. Originally, the masts were forged and pierced from solid stainless steel billets, a process requiring 11,320 tons of steel to produce about 400 masts with a finished weight of 400 tons. The new mast design, the Navy says, reduces metals requirements to only 465 tons, of which 50 tons are machined away—compared to 10,920 tons of scrap produced by the former process. Tremendous savings in use of facilities and skilled labor also result from the new design.

OLD METHOD BUT IT WORKS—Direct resistance heating is not new, but its simplicity for transferring large amounts of heat into materials is finding many applications in metalworking plants, cutting costs in many instances. Best features of the process are: No expensive machinery is involved, it is very flexible and not limited by shape, mass or electrical conductivity. Two manufacturers, prepared to spend $10,000 for equipment, were surprised to find they spent less than $1000; more surprised at the production savings. p. 86

BORON SAVES ALLOYS—"Capsules" of boron, a metal in plentiful supply in the United States are enabling steelmakers to conserve vast amounts of critically scarce alloying metals. The American Iron and Steel Institute says so far this year boron was used in as many as 70,000 tons of steel per month. A wheelbarrow load of boron dumped into a heat of steel may save almost 2½-tons of nickel, about ¾-ton of chromium and 1/3-ton of molybdenum. The Korean war, which created a greater demand for military products made of alloy steels, stimulated the use of boron by steelmakers squeezed in the alloy shortage.

IMPREGNATING METHODS ADAPTABLE—Principles involved in the specialized vacuum impregnating techniques used by Northrop Aircraft in solving some knotty production problems in connection with aluminum and copper alloy castings can be adapted to impregnation operations requiring the use of virtually all alloys and liquid sealants. The Northrop techniques make use of sodium silicate, vinyl lacquers, styrene and phenol-formaldehyde resins. p. 88

FORMABILITY PLUS—Although magnesium is the easiest of commercial metals to machine, only a limited amount of forming can be done at room temperature. When the metal is worked in the temperature range of 450 to 700° F, Brooks & Perkins says, it is possible to do in a single draw what would require up to three drawing operations in ferrous and some nonferrous metals. Allowable deformation increases more rapidly in magnesium with increase in temperature than in any other commercial metal. In other words, magnesium has greater formability at 600° F, than steel, brass or aluminum at the same temperature. Springback decreases as temperature increases. There is no springback at 600° F—an advanage of hot forming.

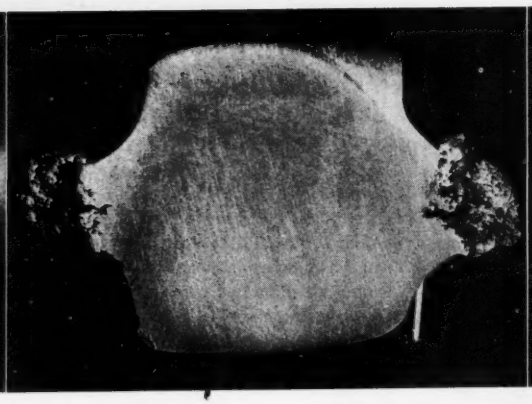
NEW MATERIAL FOR MAGNETS — Magnet making soon may be a little simpler as result of a new magnetic material developed by the Naval Ordnance lab at White Oak, Md. The material, the Navy says, exhibits a coercive force of 3000 oersteds, greater than any known permanent magnetic material. Composed of bismuth and manganese, it has a flux density exceeded only by platinum-cobalt alloy. The magnets can be made by the powder metallurgy technique, thus insuring close tolerance of complicated shapes without machining. Production involves heating powdered manganese and bismuth at 700° C, hot pressing the resulting bismuthide at 300° C in a strong magnetic field. Technical evaluation with respect to stability, aging and shock is not yet available.

CASINGS RAMMED FROM TUBING—A process of ramming shell casings out of seamless steel tubing is the latest method used by the Army Chemical Corps in producing mortar and gas shells. The process is faster than forging and machining and works best on tubing with wall thickness up to ½-inch. Basically, the process stretches the tubing to the required size by forcing through the interior diameter a ram consisting of a series of graduated outer diameters up to the desired interior diameter of the tube. p. 90

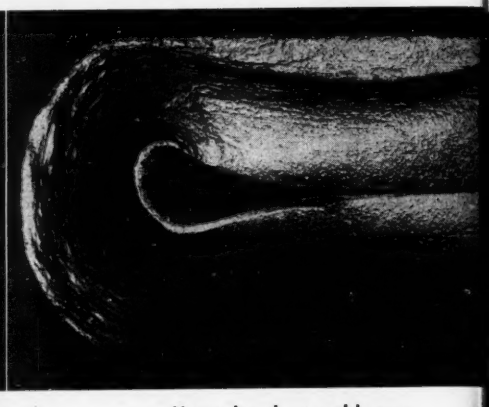
COPPER ADDS STRENGTH—Developments in powder metallurgy seem to be coming thick and fast considering that the first book on the subject was published only 10 years ago. Another milestone, according to Henry H. Hausner, manager of atomic research and development for Sylvania Electric Products Co., is the infiltration technique for making compressor plates for jet engines. In the procedure iron powder is pressed to low density, then re-pressed after the addition of copper. The latter infiltrates into the pores of the iron compact, increasing strength. Still another development is the strip rolling of metal powders by passing a stream of powder through slightly heated rolls followed by a furnace anneal, another roll, compression anneal and roll. Mr. Hausner says strips produced possess nearly ideal density and good ductility.

Metalworking Outlook—p. 47 *Market Outlook—p. 153*

Macrophoto showing upset on ½-inch rod



Cross-section of upset



U-test bend at weld area

Titanium Alloys Flash Welded Easily

Satisfactory welds can be produced on conventional hydraulic machines if material is of uniform structure and if welded parts are annealed immediately after welding

A weld that is partially ground down to get to the parent metal

By I. A. OEHLER
Director of Metallurgy and Research
American Welding & Mfg. Co.
Warren, O.

FLASH butt welding of titanium alloys is one of the lesser problems in the fabrication of these alloys. Satisfactory welds that closely approach parent metal properties are being regularly produced on conventional hydraulic machines.

Initial work at American Welding & Mfg. Co. was done early in 1949 on samples of commercially pure ½-inch diameter rod supplied by Remington Arms Division of DuPont. Excerpts from report at that time:

1. No protective atmosphere was used.

2. Specimens tested to destruction had ductile fractures adjacent to the weld in the parent material.

3. The weld zone in the as welded condition was acicular in structure.

4. Annealing at 1650° F refined this structure.

5. All welds appeared sound with no inclusions or voids apparent in the microstructure.

5-Second Cycle—Flashing travel of ¼-inch, upset travel of 7/16-inch and final die opening of ¼-inch were used. Total welding cycle consumed 5 seconds at a voltage setting of 2.9. Speed of upset was of particular importance; fast speeds, comparable to those used for aluminum, were employed.

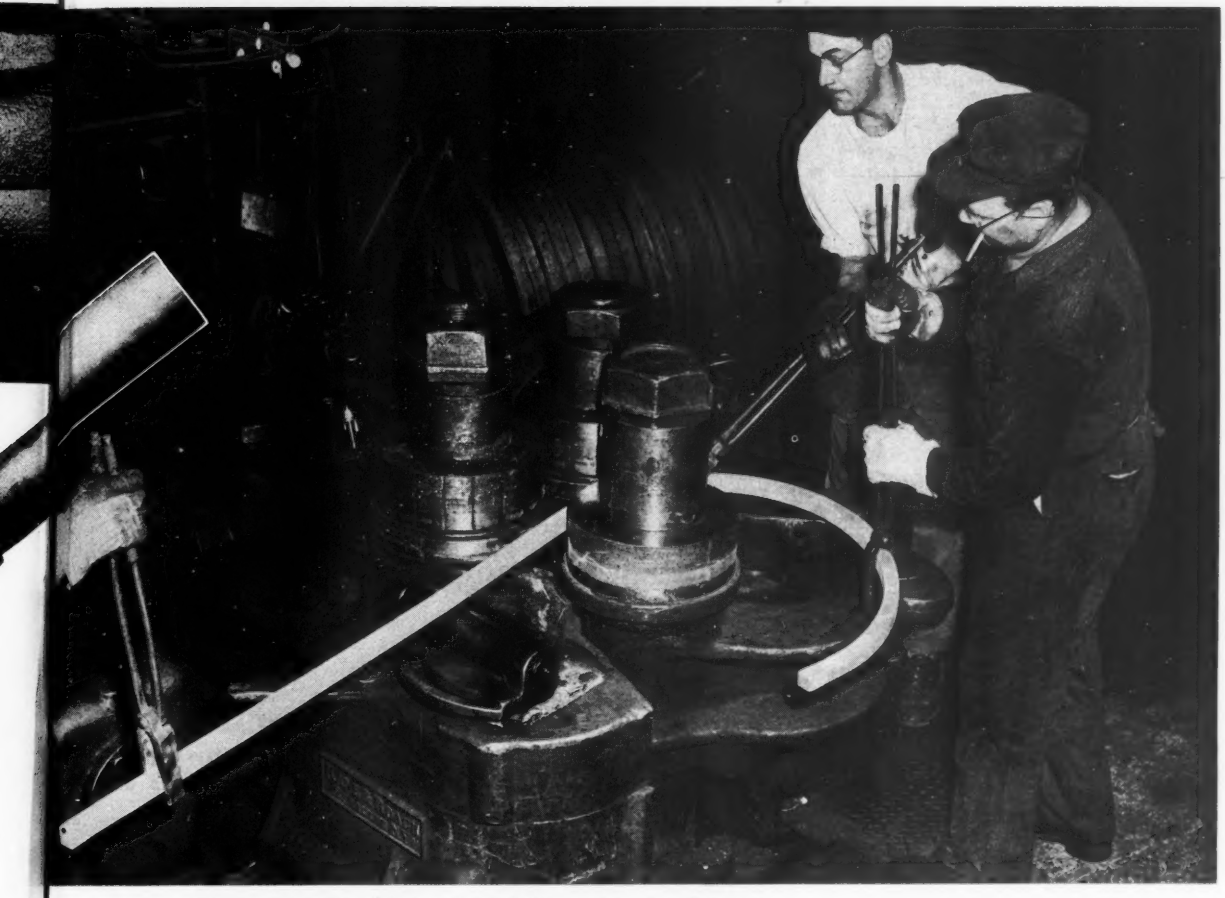
Following these initial tests, small production runs of RC70 bars were fabricated into rings and the joint flash welded. The weld burr is chipped off while hot. Cross-sections up to 2 square inches have been welded. We see no reason that several times this area cannot be welded.

Cracking Problems — Introduction of the higher strength alloys such as RC-130B and TI-150A presented a problem not normally encountered in working with other ferrous and nonferrous materials. This was the apparent sensitivity of these materials to cracking in areas of surface or structural discontinuities. On bars which had surface defects removed by grinding just prior to shipment from the mill, cracking occurred when the bars were clamped in the welding machine. One lot, which had been checked for hardness at the mill, fractured through the Brinell impressions.

If fracture did not occur at these points immediately upon clamping, cracks appeared sometime after the weld was completed. The additional stresses set up by the thermal gradient during the welding cycle apparently are sufficient to cause failure.

When bars were annealed at the mill after surface preparation, no trouble was encountered. In our own processing, it was found that a rough chip or grind mark resulting from burr removal could give rise to cracks; but cracking could be avoided by getting the rings into a furnace at 1300° F immediately after welding.

Flash Travel ¾-Inch—A typical weld cycle for 2x5/16-inch bars of RC-130B flash welded into a ring consumes 8 seconds with the voltage (open circuit) at 6.2. Flash-



Cherry-red titanium being formed into a jet aircraft ring

ing travel was ¾-inch, upset travel ⅜-inch and final die opening ½-inch. That cycle produced welds of 152,000 TS, 146,500 yield, and 15 per cent elongation in 2 inches with a reduction in area of 46 per cent.

Occasionally welds of good strength exhibited low ductility—elongations of 1-7 per cent. Investigations in the customer's laboratory, as well as in our own showed this to be associated with a banded structural condition in the bars. Additional welds made in the same banded bar showed low values.

A similar condition is encountered on heavily banded dirty steels that are flash welded. The upset portion of the welding cycle turns the fibers at the weld outward so they lie transverse to the bar axis and the inclusions present in the material act as notches which produce brittle failures. In the titanium alloys, a banded structure without any apparent inclusions as such, is sufficient to produce failure. This condition is now well known to the alloy manufacturers and so should not be encountered in the future on flash welding applications.

Ti Welded to Al—Titanium alloys have been flash welded to aluminum alloys and to carbon steels. This work was carried on only as a curiosity, with no present practical applications in mind. On such joints, failure occurs outside the weld when tested in tension or bending.

Flash welding of titanium alloys can be readily accomplished provided: 1. Material is of good quality and uniform structure. 2. Techniques similar to those used for aluminum are employed. 3. Welded parts are annealed or otherwise furnace treated immediately after welding.

From data presented by the author at the Titanium Fabrication Conference, Minerals and Metals Advisory Board, National Academy of Sciences, National Research Council, Cleveland, June 19.

Material Brazes Moly Rapidly

New material for high temperature brazing of molybdenum and tungsten electronic components is reported by American Electro Metal Corp., Yonkers, N. Y. Dr. Paul Schwarzkopf, president, says the material, called Mo-braze, melts at about 3450°F, forming a continuous braze upon solidification.

The brazed joint is formed rapidly, usually without any oxidation of the parts, reports Dr. Schwarzkopf. He adds that when large parts are furnace brazed, excellent assemblies can be obtained in the range between 3450 and 3800°F. The material can be used satisfactorily to braze molybdenum to molybdenum, tungsten to tungsten or molybdenum to tungsten.

The firm reports other results of work with the product indicate this braze will not volatize to any detectable extent at useful temperatures.

Direct Resistance Heating

Simple method for transferring large amounts of heat into materials is finding numerous applications in metalworking plants

By LEWIS B. REED
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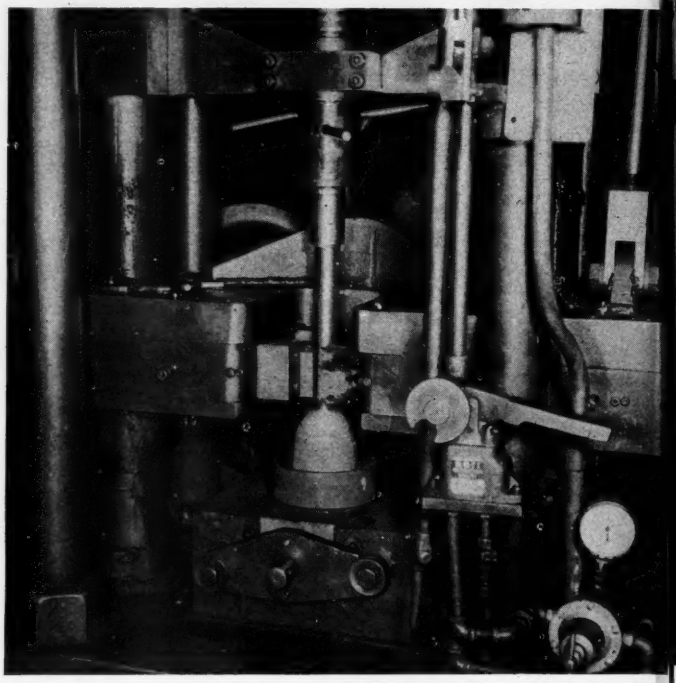
Department of Water & Power
Los Angeles



Heating unit and upsetting die of machine at Thompson Products. Current passes through rod from controls, in approximate center of picture, to die

HARD-TO-SOLVE heating problems sometimes have easy solutions. Just pass electric current through the object. True, this method has limited application, but it is surprising what a lifesaver it can be in those limited applications.

This method, often termed the direct resistance heating method, is not new. In industry, Thompson Products still has machines, patented over 20 years ago, which are using the direct resistance heating method.

By far, most electric heating is done indirectly; i.e., an electricity conducting medium is heated by passing electric energy through it, and the heat is transmitted by convection, radiation, and/or conduction to the object or substance which it is desired to heat. This method is the most flexible, and not limited by shape, mass or electrical conductivity. Its use, however, merely replaces the flame in fuel-fired heating devices with an electrically heated mass.

Direct Approach—Induction and dielectric heating methods are unique with electric energy. They were extensively developed during World War II. These methods, like direct resistance heating, make it possible to transfer large amounts of heat into materials. When applicable they frequently show advantages which justify the relatively heavy expense. Direct resistance heating, on the other hand, is not used so much as it could be, probably because it is not so well understood and the fact that there is no expensive machinery to sell.

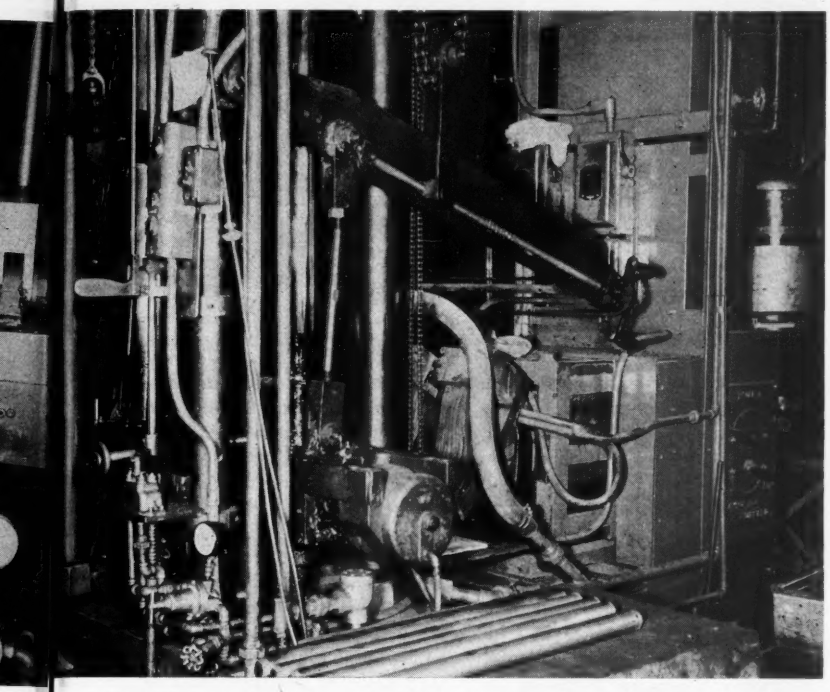
Two examples can be cited which indicate what can be done with proper application. In both cases manufacturers had heating problems which they thought could be solved with induction heating. In both cases they were prepared to spend in excess of $10,000 for that type of equipment, but in the end each spent less than $1000.

Two Hours to 60 Seconds—First manufacturer had a 20-foot length of spined copper tubing which he was annealing by hand torch. This operation took two man-hours. Experiments in a laboratory showed that the same result could be obtained in 60 seconds by impressing 25 to 30 v directly on the tube and passing approximately 3000 amp through it.

Based on the information from the tests, a 100-kva transformer was designed and arranged to be connected through air-operated clamps to two lengths of spined tubing. The two lengths are mounted side by side to reduce inductance, and are brought up to annealing temperature in less than 60 seconds. Because of this heating operation, no oxidation takes place inside the tubing, and cleaning operations are eliminated.

The second manufacturer desired to anneal spring steel strip. Tests in the laboratory indicated that 1800 amp would give the desired temperature in less than 1 second, so a machine was developed which would give practically instantaneous annealing, and would operate in the production line without slowing the flow of work.

A new type band saw is being developed which maintains an electric potential between the teeth and the work, thus increasing the cutting speed remarkably, especially on hard and tough materials.



A 300-kva transformer and leads for direct resistance heating of steel rod. Side view of machine doing the work is shown in the closeup photo at left

Another example of direct resistance heating is the present method by which carbon is changed to graphite.

How Much Heat?—Theoretically, any mass will conduct electric current if enough voltage is applied across it. Each will have a different resistance, with the total varying according to the length and cross-section. A mass having a very low total resistance requires a very high current to produce the heating effect, but by using low voltage this current can be developed. Shape of the mass is an important factor, since a mass of irregular shape will not heat evenly because of the higher resistance in the narrower cross-sections. This causes them to become hotter than the larger cross-sectional areas, although this could be an advantage sometimes.

Ignoring losses, the amount of sensible heat in watt-hours required to raise the material to the desired temperature is determined by this formula:

(a) Watt-hours = (Weight of material in pounds) × (Specific heat of material) × (Temperature rise in degrees F.)/3.412.

Since one of the advantages of the method is the speed with which the object can be heated, normal practice is to step up the wattage to shorten the time. To determine wattage for short heating periods, use this equation:

(b) Watts = (Watt-hours from (a)) × 60/Minutes of desired heating period.

Disregarding power factor, current necessary is determined by:

(c) Amperes = √Watts from (b)/Total resistance.

and voltage by:

(d) Volts = amperes × total resistance.

Power Factor Effect — Power factor will increase the needed amperes and volts, but depends on several intangibles which are best determined by test. Effect of power factor frequently can be reduced by the shape of the circuit. For instance, if steel rod is to be heated, two rods can be heated at one time with the rods placed side by side so the circuit will resemble an elongated U; or a grid could be formed.

Amperes obtained in (c), with power factor disregarded, will give an idea of the amount of current an application will take, and should suffice without consideration of heat losses if the heating period is a short one. In longer heating periods there will be losses largely from radiation which can be determined by Stefan-Boltzmann's law. Since this law is for radiation from a perfect black body in air, it will not necessarily be accurate at temperatures below the color range.

The law is:

(d) Watts per square foot per hour radiated = $0.0462\ (T/100)^4$ where T is absolute temperature in degrees Fahrenheit.

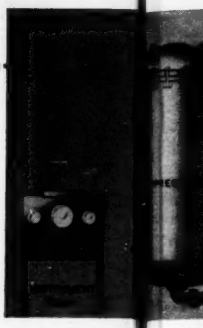
In measuring electrical resistance, it should be remembered that the resistance usually will rise as the material is heated. Unless resistance curves are obtainable for the particular mass being heated, it is almost necessary to measure the resistance at the desired temperature. Also the alternating current resistance for magnetic steels is different from the direct current resistance. The ratio, or amount of difference, varies with the size, configuration, and current density.

Best by Trial—It is possible for an electrical engineer to compute most of these qualities, except when they involve complex shapes. Exact computations, however, are not necessary. They are useful only to obtain a general idea as to whether the application is economical. There is only one way to be correct, and that is by trial. Have the transformer designed with taps which will allow latitude in selecting the proper voltage.

Another use of this method of heating is in the development of heating elements. Often heating elements on the market do not fit the specific needs, yet it is quite possible they can be so designed.

It is necessary to compute what your electrical requirements will be. With that figure then determine if the problem can be solved economically, considering cost of transformer, size of copper etc. If it appears reasonable, try it on the electric utility representative. Many electric utilities have specialists in industrial heating who are familiar with such problems.

How Northrop Aircraft .....



Vacuum Impregnates Metal Castings

Specialized techniques are adapted to impregnating aluminum and copper alloys with sodium silicate, vinyl lacquers, styrene and phenol-formaldehyde resins

By THOMAS A. DICKINSON

SOME KNOTTY production problems have been solved by the development of specialized vacuum impregnating techniques in Northrop Aircraft's new plant at Anaheim, Calif.

These techniques are adapted to impregnating castings comprising aluminum and copper alloys with sodium silicate, vinyl lacquers, styrene, and phenol-formaldehyde resins. The principles involved can be adapted to impregnation operations requiring the use of virtually all alloys and liquid sealants.

Vacuum impregnation consists of placing machined and cleaned castings in a chamber, whence all air can be evacuated prior to the immersion of the castings in a solution, after which air pressure may or may not be used to force the solution to penetrate the cast metal pores. Purpose of this is to increase the wetting action of the solution by removing air particles that would normally clog the metal pores as they were submerged.

Sodium Silicate Used—Aluminum alloy castings are vacuum impregnated with sodium silicate or water glass to meet the requirements of U. S. Army specification 51-70-1A (finish No. 24.01). This necessitates the preliminary cleaning and degreasing of the casts with Kelite T-131, Solvesso No. 2, Ansco A, and hydrogenated naphtha (first of which is an alkaline solution, heated to about 150° F prior to use). Some castings are also anodized before they are impregnated.

If the castings are stored for any length of time after they are cleaned and/or anodized, preheating is necessary to remove moisture particles from the metallic pores. This involves the use of a thermostatically-controlled oven, set for a temperature of about 250° F, for at least 1 hour.

Preheated casts are allowed to cool to room temperature before they are placed in an impregnation chamber, since heat can affect the condition of the impregnant. Then all casts are arranged in the chamber so their surfaces will be fully accessible to sodium silicate.

Chamber Pressure Reduced — Next the cover of the impregnation chamber is locked in place, and a high-vacuum pump is used to reduce chamber pressure to at least 10 inches Hg. The vacuum is held for at least 20 minutes, then the vacuum pump is turned off and a valve is actuated so that fluid sodium silicate will enter the impregnation tank (rising to a level of at least 6 inches above the castings).

Sodium silicate is considered suitable for use as a class A impregnant if it has a minimum specific gravity of 1.38 at 20° C, no more than a 0.10 chloride content, a solids content of 1 per cent or less, a sodium oxide content of 8.60 per cent or more, a silica content of 28.50 per cent or more, and a ratio of sodium oxide to silica of 1:3.52.

Pressure On—As soon as the castings are fully submerged, the reservoir valve is turned off and the vacuum pump is turned on again to reduce pressure in the impregnating chamber of 10 inches Hg. The latter pressure is maintained for 5 minutes, then the vacuum is released and the chamber is pressurized with clean dry air to about 45 psi for at least 20 minutes.

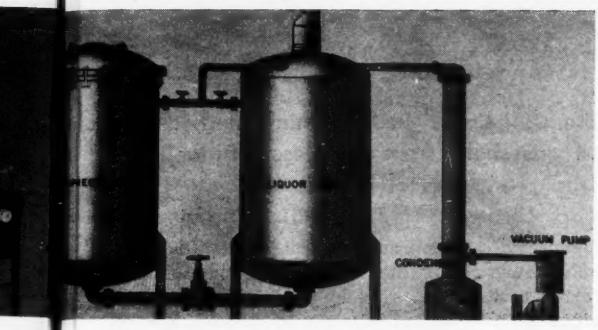
Sodium silicate is pumped out of the impregnation chamber and back into its reservoir without reducing the latter pressure. Then all valves are closed and the pressure in the chamber is reduced to an atmospheric level.

When removed from the impregnation chamber, the castings are allowed to drain thoroughly before they are taken to a baking oven, where their impregnant is solidified by 3 hours of heating at 212° F.

Use of Vinyl Lacquers—Copper bearing alloys are impregnated with Vinylite No. 2140 lacquer, comprising 50 per cent thinner by volume, to meet the requirements of the aforementioned Army specification for finish No. 24.02. Such alloys include all cast materials comprising 5 per cent or more copper. They are cleaned, degreased, and sometimes anodized the same as the aluminum alloys. Then they are dehydrated at a temperature of 250° F for an hour, cooled to about 100° F and loaded in the impregnation chamber.

Slightly - elevated temperatures are allowable in the subject circumstances because they enlarge the metal pores that must be impregnated and increase the fluidity of the thermoplastic impregnant.

When closed, the impregnation chamber is evacuated until a pressure of at least 28 inches Hg. prevails. This pressure is held for at least 20 minutes, then the vacuum pump is turned off and a reservoir valve is opened so vinyl lacquer will enter the chamber—rising to a level 6 or more inches above the castings. Then the reservoir valve is closed and chamber pressure is again reduced to 28 inches Hg. for 5 minutes.



Schematic diagram showing details of a typical vacuum-impregnation setup

View of equipment used in processing castings at Northrop

Castings Removed — Next, the vacuum is released and the chamber is pressurized with clean dry air to 60 psi for at least 20 minutes. Then, after excess lacquer is returned to its reservoir under pressure, chamber pressure is reduced to the atmospheric level and castings are removed from the chamber.

Following a short draining interval, the castings are immersed in thinner for a few seconds to remove excess quantities of impregnant, and allowed to dry. Compressed air is frequently used to accelerate the drying of the casts, after which the impregnated parts are baked for 1 hour at 200° F.

Lacquer exudations can sometimes be observed on casts that have been baked, but these can usually be removed without difficulty by further cleaning the casts with volatile solvents.

Styrene Impregnants—Monomeric styrene solutions are used in place of vinyl lacquer impregnants where aluminum alloys with less than 5 per cent copper require a 24.03 finish. Prior to impregnation, the cast metals are cleaned with the aforementioned solutions and solvents; also, as a rule, they are anodized.

Preheating at a temperature of 250° F for an hour removes moisture from the casts, after which the latter are cooled to about 100° F and loaded in the impregnation chamber.

Pressure in the chamber is next reduced to 28 inches Hg. and held for 20 minutes before the vacuum pump is turned off. Then the casts are submerged in liquid styrene and chamber pressure is again reduced to 28 inches Hg. for 5 minutes.

When the vacuum is released, 60 psi pressure is built up on the impregnant in the chamber and held for at least 20 minutes, after which excess styrene is returned to its reservoir before the pressure in the chamber is reduced to the atmospheric level.

Castings Drained — Removed from the impregnation chamber, the casts are thoroughly drained and cleaned by further immersion in the Kelite T-131 alkaline solution for several seconds. A rinse in clean water at a temperature of about 120° F halts the action of the alkaline solution on the casts, after which the latter are dried and baked at a temperature of 265° F for 2 hours. Baking is done under a pressure of about 90 psi in an inert gaseous atmosphere of nitrogen or carbon dioxide to avoid volatilizing the styrene.

Resin exudations on baked castings are removed by immersing the casts for 30 to 60 seconds in a stripper solution—active ingredients of which include 14.5 parts sodium metasilicate (pentahydrate), 71.5 parts disodium phosphate, and 14 parts Triton X-30 (a surface active agent). Stripper solution is prepared by dispersing 7 per cent active ingredients in 93 per cent water by weight. It is used at temperatures ranging from 180° to 190° F.

Any film remaining on a cast after it has been immersed in a stripper solution and rinsed for 3 or 4 minutes in tap water can be removed by polishing the metal surfaces with a clean, soft cloth.

Use of Phenolic Resin—Phenol-formaldehyde impregnants of the type now made by Western Sealant Co. are preferred by Northrop where government specifications do not specify the use of other ma-

terials. Prior to the use of a phenolic impregnant, casts are cleaned with the alkaline solution and vapor-degreased by means of trichlorethylene; further, they are usually anodized.

In many circumstances, casts can be adequately dehydrated for phenolic impregnation by preheating to about 225° F for only 30 minutes. Then they are cooled to room temperature and loaded in the impregnation chamber, which is next evacuated for 27 inches Hg. pressure for 15 minutes.

Cold Storage—Phenolic impregnants are stored in a refrigerated reservoir so their usefulness will not be limited by premature polymerization or solidification; and, prior to use, a specified quantity of phenolic resin is transferred to a room-temperature container so it can be mixed with a catalyst or hardening agent. The catalyst comprises a small quantity of acid crystals (having ⅛ of 1 per cent of the weight of the resin) dissolved in monomeric styrene to facilitate mixing operations.

When properly catalyzed, the phenolic impregnant is transferred to a reservoir from which air can be evacuated for a pressure of less than 29 inches Hg prior to the immersion of casts in an adjacent pressure tank.

After casts in the impregnation tank are fully immersed in the catalyzed solution, chamber pressures of 27 inches Hg. or less are maintained for 5 minutes. Then the vacuum is released and the chamber is pressurized with clean dry air to 100 psi for 30 minutes.

Removes Excess Resin—Excess resin is removed from the impregnation chamber before the latter pressure is reduced for the removal of casts, which are subsequently drained and taken to a cleaning tank. The latter tank contains trichlorethylene, and the castings are immersed for 1 to 20 seconds to remove all resinous materials.

Next, the casts are thoroughly dried and conveyed to an oven for an hour of heating at 225° F. Then the casts are inspected for exudations.

Further heating (for 3 hours at 225° F and 30 minutes at 300° F) solidifies the phenolic impregnant remaining in the pores of the casts.

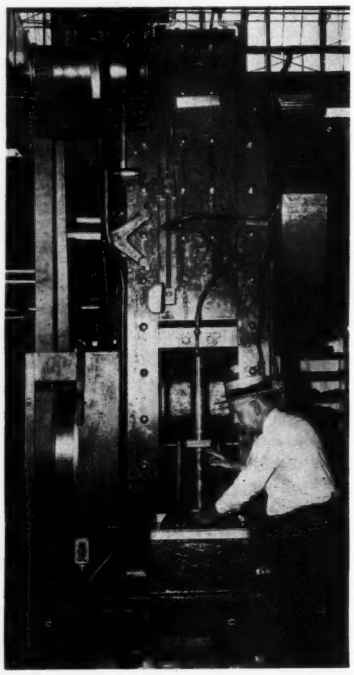
Rammed Shell Cases . . .

• • • Army Chemical Corps' fast ramming method produces mortar and gas shells from seamless tubing in 22 seconds per shell

ARMY Chemical Corps is replacing the forging and machining method of producing mortar and gas shells and other casings by a much faster process of ramming the casings out of seamless steel tubing.

Stretch Process — Test sizings have been made on tubing from 1⅛ inches to 6 inches in interior diameter. The system is reported to work on tubing having wall thickness up to ½-inch. Greatest length tried on a production basis was on the 16-inch-long 4.2-inch mortar shell.

Basically, the process stretches the tubing to the required size by forcing through the interior diameter a ram consisting of a series of graduated outer diameters up to the desired interior diameter of the tube. Oil force fed through the ram lubricates the tube during the sizing operation. A 150-ton press is used. This has sufficient capacity to ram out several tubes simultaneously in the smaller sizes.



Henry Fischer, chief of the machine production shop at the Army Chemical Center, Md., inspects his invention for producing mortar and gas shells

Big Time Saving—Chief advantage of the process is in the time saving. Whereas the boring of a forged case takes between 6 and 12 minutes, the ramming operation takes 22 seconds, a speed-up of a minimum of 16 times. Elimination of the scraping of the metal in the boring operation is an important cost item.

Other advantages are: 1. Minor imperfections in the tubing (pitting, indentation and curvature) can be ignored, since the ramming eliminates them; 2. the glossy interior finish facilitates shell loading; 3. standardization of the bore cuts down need for testing of the finished tube, and 4. the work-hardening of the metal produces a finer and consequently deadlier fragmentation of the shell when it is exploded.

The tube-sizing process will shortly be tried by the Ordnance Corps on a contract with a commercial firm.

Patent on the process has been applied for.

Heavy Body Line Introduced

Galion Allsteel Body Co., Galion, O., reports it is introducing a heavy-duty line of side dump truck bodies. Units are entirely mechanical in operation and dump right or left as desired.

Self-contained subframe consists of three heavy box-type outrigger cross members. Front and rear outriggers are built with a series of gear-like teeth that roll inside the formed channel tracks welded to the body. This construction locks the body in a stationary position and prevents forward or backward movement on the subframe.

WATCH YOUR MATERIALS

Test First Then Fabricate

That's the key to lower labor costs, fewer rejects, ASTM members told. Testing as you go can prune production costs as much as 25 per cent

IF PLANT management today would spend as much time and effort in finding out how good materials are, as they do in discovering high production machines and other automatic processing methods, they could lower production costs as much as 25 per cent more in many instances.

The secret: Test first then fabricate.

By following such a procedure all along the production line reject output would be much lower and labor costs much less, Dr. R. C. McMaster of Battelle Memorial Institute, told members of American Society for Testing Materials in New York. He gave the Marburg lecture during the society's 50th annual meeting the week of June 22.

Know Your Tests—Use of nondestructive testing methods, he says, can do the job in almost every instance effectively. There are tests to meet nearly every situation, but the main thing a manufacturer should do is to find out what nondestructive testing cannot do. A test, he says, can transmit certain information to you, but it can't do anything about it. The course of action is up to the manufacturer.

In the symposium on light microscopy, C. W. Mason of Cornell University says training engineers in microscopy should be a must. Not in the technique of using it, he added, but from the standpoint of what information can be obtained from it. It may be that using the instrument on materials first instead of last may save a lot of time and unnecessary researching.

Can See What Happens — Mr. Mason says that materials engineering should involve experience and reasoning in terms of close-ups. A microscopical background develops this way of thinking even without continual recourse to the instrument. Its very directness makes for realistic interpretations of test data and, in addition, local variations and unexpected structures are recognized as they never can be from curves and tables.

The best thing about the microscope, says H. W. Zieler, W. H. Kessel & Co., Chicago, is that you can see what occurs. If one can see what is happening in a material a more realistic understanding is derived to improve its performance. Measuring properties of the mass as a whole may be more practical, but more effective steps can be taken if something more is known about components making up the mass.

Higher Temperatures — In the last 50 years or so, steam turbines have progressed along lines that affect material consideration in several interesting ways, Norman L. Mochel, manager of metallurgical engineering for Westinghouse told ASTM members in delivering his Gillett memorial lecture.

"In the matter of temperature increase there has been a progress of more or less of 12° F per year—operating temperatures now are at 1100°F."

Along with a reduction of floor space, he pointed out, less structural steel is required per kilowatt hour in the manufactured power field (STEEL, June 30, p. 48). By 1954, he predicted, about 18 pounds of structural steel per kilowatt hour will be needed, whereas new construction in 1945 required 45 pounds per kilowatt hour.

Better Metals Did It—What did the trick, he said, was materials like 12 per cent chrome, low carbon steels, the use of leaded nickel brass and 12 per cent chrome, 0.5 per cent moly steel and other chrome-moly and chrome-moly-vanadium steels.

"Although there is evidence of increased activities in the field of copper production, the demands for copper in the years ahead will be tremendous and warrant constant attention. The widespread activities today to replace copper where possible with aluminum are of great significance. These activities merit the co-operation of all."

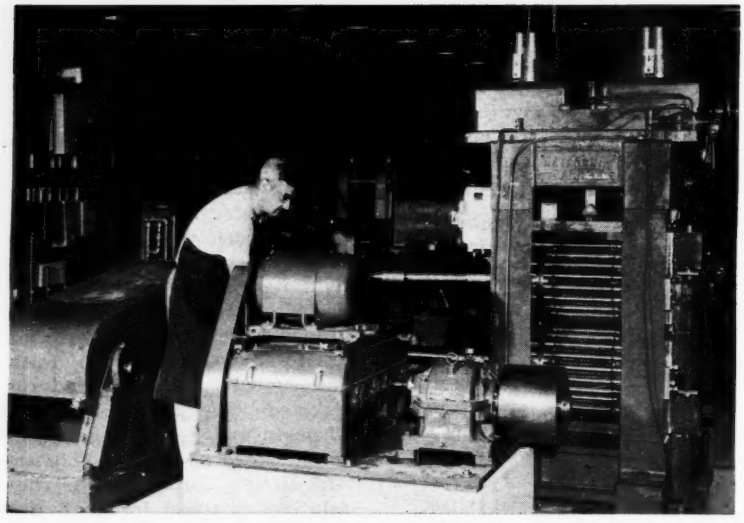
A new type precision corrosion test to study the corrosion resistance of bare steel specimens was reported by A. J. Opinsky, R. F. Thomson and A. L. Boegehold of the Research Laboratories of General Motors Corp., Detroit. They said that the rust formed during a 20-day exposure period is on the brittle side and possesses a lamellar nature. The latter tendency can be associated with the nonprotective nature of the rust.

Stepped Up Test—According to the authors, the magnitude or corrosion losses of steels exposed to this test is about three times that of the same steels exposed to a modified ASTM salt spray test for the same length of time.

Comparison of similar steels exposed to the test and to the atmosphere at Kure Beach, N. C., shows the new test to be an accelerated one, and one that will differentiate between steels showing considerable differences in corrosion losses under atmospheric exposure conditions. Duplicate tests on some of these steels show that the data obtained from the new test are reproducible.

M. A. Cordovi, metallurgical engineer, Babcock & Wilcox Co., New York, and consultant at Brookhaven National Laboratory, Upton, N. Y., revealed a method of evaluating corrosion by molten metals which is in use currently with considerable success at Brookhaven. He pointed out that while the method was developed primarily to measure the amount of corrosion by molten metals, it is generally applicable to all kinds of corrosion and oxidation tests.

One Measurement—Materials in the tests, he says, are exposed to the action of molten bismuth alone and in combination with other liquid metals at 1000° F and higher. The method affords the possi-



Business End of the Sendzimer Mill

End view of the Sendzimer hot strip mill installed recently at the Naval Ordnance Laboratory, Silver Spring, Md., shows the rollers through which metal passes. In about one minute, an ingot 1 inch thick and a foot long is reduced to 0.030-inch thick and lengthened to 33 feet by passing through these rollers

bility of measuring the extent of maximum as well as the average attack by a single set of determinations. Also the extent of corrosion is determined by a simple direct measurement, the accuracy of which is not contingent on the amount of corrosion products or on the mode of attack.

Use of low tin filler material and development of new methods of tinning are materially reducing the amount of critical tin necessary to provide a satisfactory job in automobile body soldering, Homer C. Pratt, project engineer, Fischer Body Division, General Motors Corp., Detroit, told ASTM members.

Mr. Pratt says that using as a base an average of 5 pounds of solder per body, the tin used in automobile body solder materials, prior to these developments was 1 pound while at present the amount of tin is 0.18-pound—a saving of 0.82 pound per body. In the opinion of the industry, he says, the amount of tin now being used is at a minimum, and that any further reductions in the amount of tin used in these soldering materials would result in an inferior quality product.

Bends Recover Ductility—N. H. Polakowski, research fellow, metallurgical department, University College, Swansea, Great Britain, reported that it is now possible to show without resorting to metallography that 96.6 per cent aluminum, 2S and 3S alloys, commercial copper and low carbon steel, cold drawn or cold rolled for only 15 to 35 per cent (maximum 60 per cent) may recover their lost ductility to a lesser or greater degree simply by being subject to a few reversed plastic bends.

This effect, he says, may thus take place during various straightening and levelling operations on sheet and rods in multiroll processors and rectifiers. With the aluminum alloys, reversed twisting produces similar results as reversed bending. He pointed out that the slight improvement of fatigue properties of aluminum and some copper alloys by cold working may be due to this mechanical softening which is operative during cyclic staining.

In all, some 165 papers were presented during the formal technical meetings. As result of recommendations in the approximately 70 committee reports, 75 new specifications and tests were approved for the first time.

New Steel Specs—The society's committee A-1 on steel presented five new tentative specifications and recommended the revision of 35. It also suggested the adoption as standard of one tentative. The five new ones are: Methods and definitions for mechanical testing structural steel; specifications for heavy walled carbon and alloy steel castings for steam turbines; specification for 5 per cent chromium, 0.5 per cent molybdenum steel plates for boilers and other pressure vessels; specification for alloy steel bars for nitriding and specifications for electric-fusion-welded austenitic chromium-nickel steel pipe for high temperature service.

The tentative recommended by the committee for adoption as standard is on heat treated steel helical springs.

New tentative specifications recommended by committee B-2 on nonferrous metals and alloys cover iodide titanium; titanium strip, sheet, plate, bar, tube, rod and wire and titanium ingot. Those recommended by the committee for adoption as standard are: Metallic antimony; fired-refined casting copper and classification of coppers.

Other Tentatives — Committee B-7 on light metals and alloys, cast and wrought, recommended the following new tentatives: Aluminum and aluminum alloy pipe and tube for pressure vessel applications; aluminum and aluminum alloy bars, rods and shapes for pressure vessel applications. It also introduced a recommended practice for codification of light metals and alloys, cast and wrought.

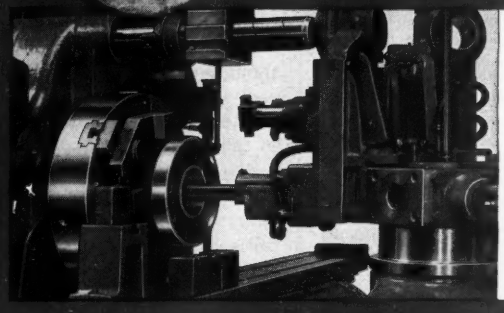
A new tentative recommended by the committee B-9 on metal powders and metal powder products covers the practice for evaluating the microstructure of apparent porosity in cemented carbides.

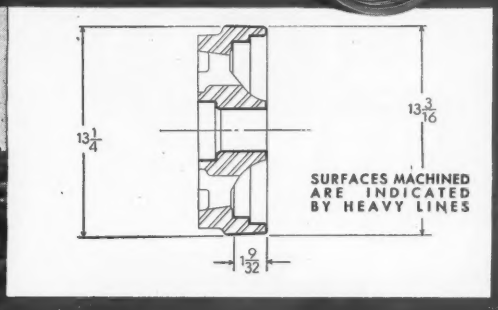
Two new tentative specifications, besides revisions in seven others and changes in 27 of the standard specifications were recommended by the committee B-5 on copper and copper alloys, cast and wrought. The new tentatives were for rectangular copper wire for general purposes, and copper-base alloy centrifugal castings.

Committee A-3 on cast iron recommended a new tentative for chilled and white iron castings, and committee A-7 on malleable iron castings suggested a revision in the standard specifications for malleable iron castings.

Between this..... and this

13 SURFACES MACHINED, INCLUDING SINGLE-POINT TAPER TURNING OF O.D.





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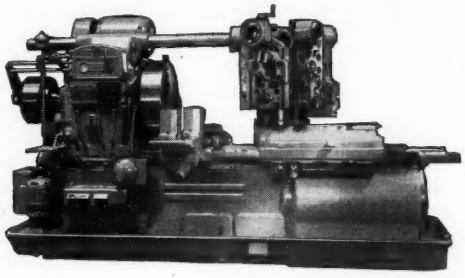

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Better Rectifier Seen

NBS says its titanium oxide product shows promise of a major improvement

SEMICONDUCTING titanium oxide in a single layer, a sheet of titanium metal and a counterelectrode of some other conductor, used in a new type rectifier, promise to effect a major improvement in this metal-oxide product.

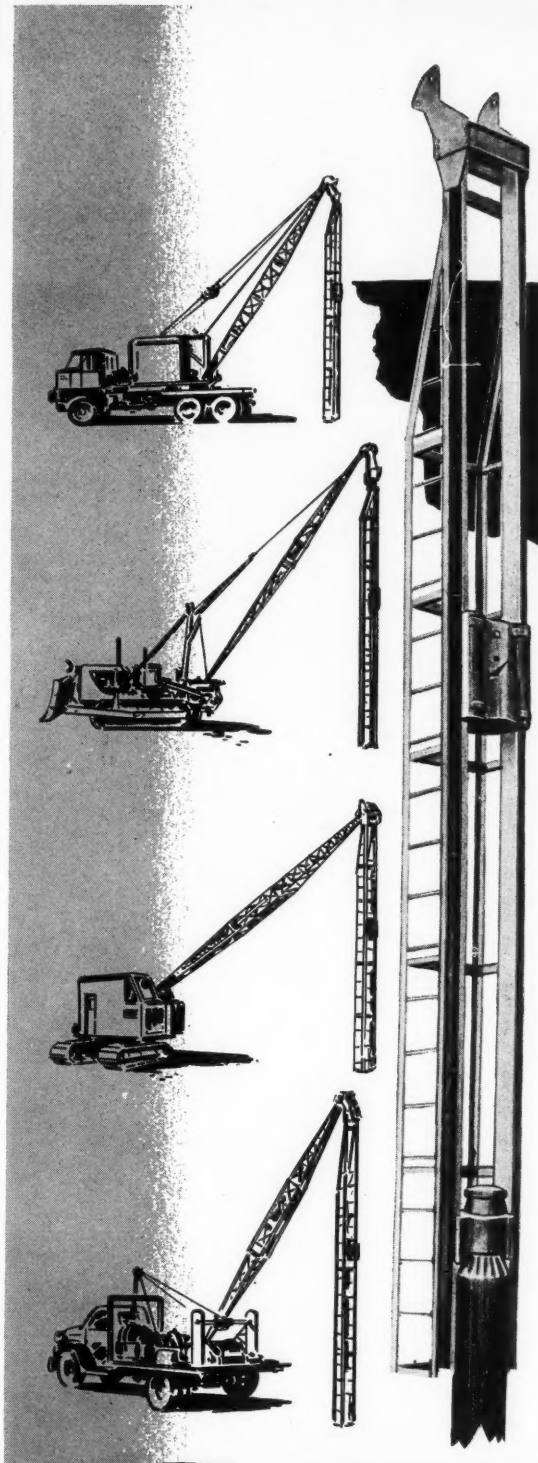
This is the report made by National Bureau of Standards after preliminary investigations. Although development is still in an early stage, the units have demonstrated ability to withstand voltage in the reverse direction reasonably well. NBS says also that their properties have been found to be satisfactory at elevated temperatures.

Bureau's rectifiers are prepared by forming a layer of titanium dioxide on a sheet of titanium metal, then applying a counterelectrode to the oxide surface. Two processes have been devised to form the oxide layer. The first involves heating the titanium metal in oxygen gas, then in hydrogen gas. The other—an improved version of the first—consists of heating the titanium metal in steam at elevated temperatures.

Difficult to Control—Rectifiers produced by the first process are electrically controlled satisfactorily. The two-step process is difficult to control. In addition, the oxygen and hydrogen gas tends to dissolve in the heated titanium metal and make it brittle. The second process of oxide formation, using water vapor, produces the semiconducting oxide layer on the metallic titanium in one step.

The most satisfactory films are formed by heating similar titanium plates in steam at 600° C for about 3 hours. The counterelectrodes are then electroplated in the same manner to form a finished unit. This process produces a rectifier with improved electrical properties but lacks the undesirable embrittlement accompanying the other method.

Units can withstand a reverse voltage of about 20 v per plate. They have good properties at elevated temperatures—performance is actually improved with increas-



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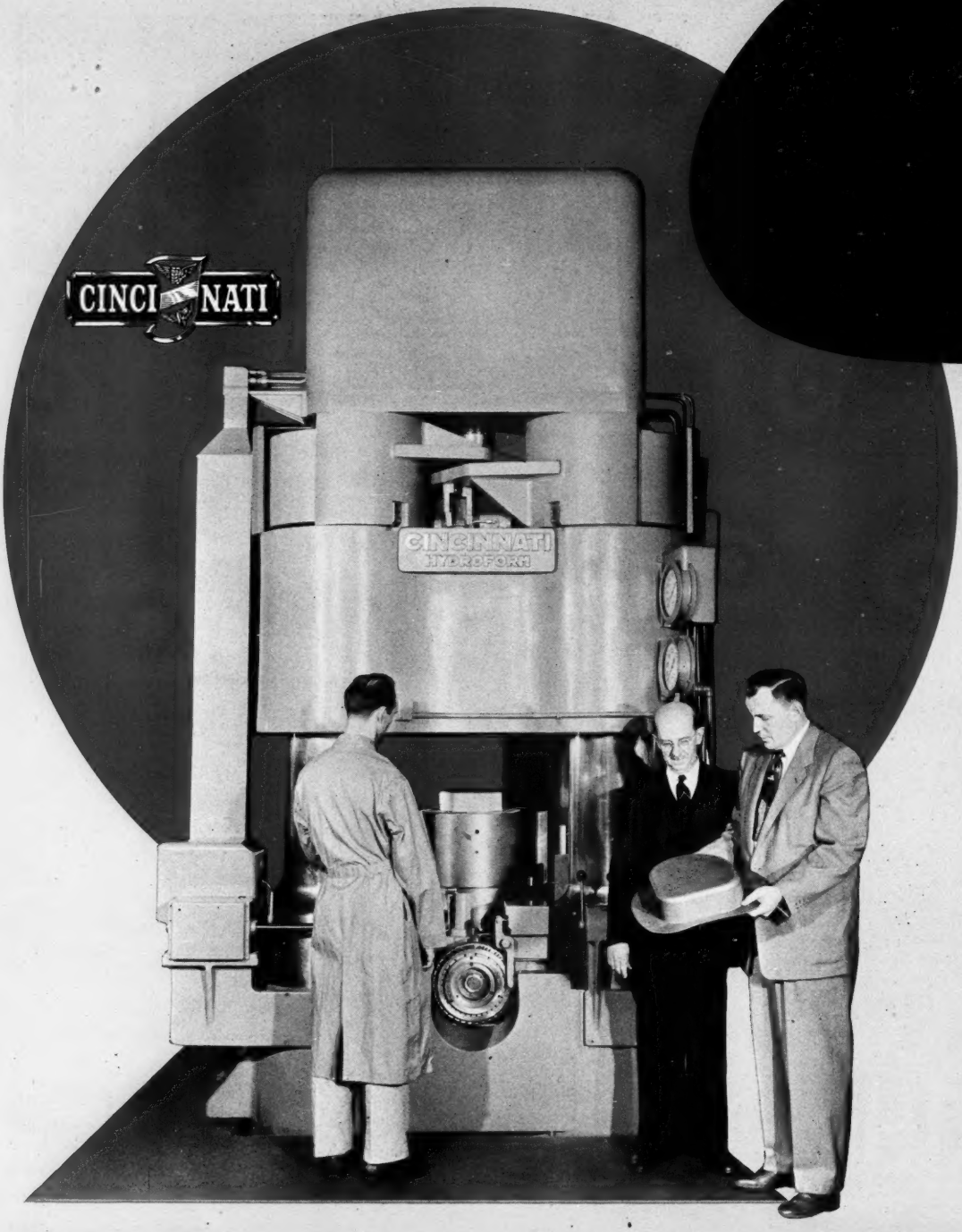

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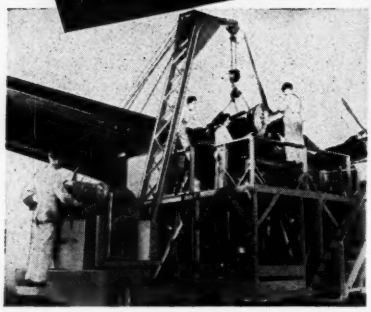
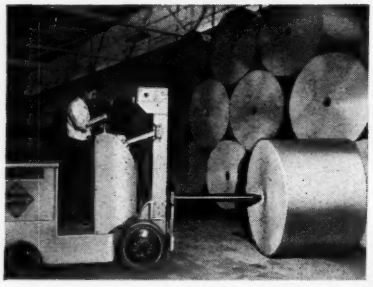


1. *E-P crane lowers bomber engine into place. Twice as fast as previous method, with less labor.*



2. *E-P fork truck picks up rolls on ram—even high tiered rolls—with but ¼" difference in size of ram and hole.*

3. *High stacking huge tires with Elwell-Parker fork truck—a skillful operation.*

4. *Forged crankshaft, still at luminous heat, safely handled on skid by Elwell-Parker low lift truck.*

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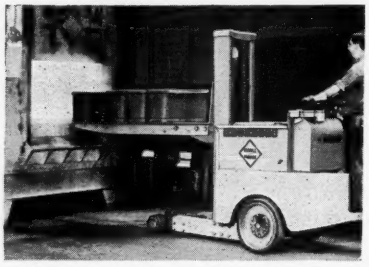
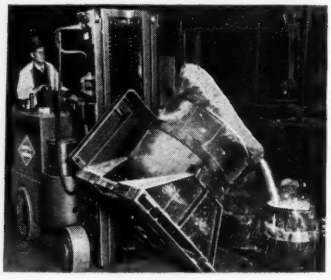


6. *Platform of this Elwell-Parker enters right into annealing oven to deposit or remove loads.*



7. *E-P Rotary Device permits molten metal to be poured with ease and safety.*

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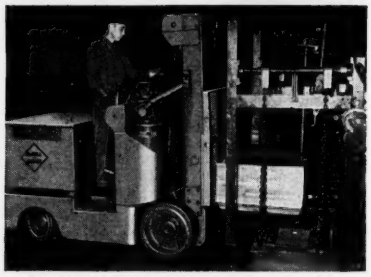
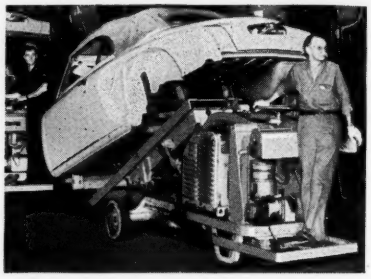
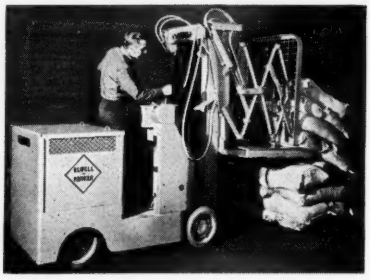


8. *Specially engineered E-P attachment makes this amputee driver "as competent as any two-handed driver" spotting load of tin plate on movable base.*



9. *Trucks carry auto bodies, also upend and store them vertically, to get 3 times as many in same floor space.*



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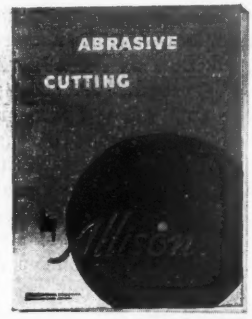
ing temperature up to about 150° C. Detailed studies have not been made of their operating life, but tests that have been made thus far are encouraging.

Fundamental Differences—NBS reports its titanium dioxide rectifiers bear a physical resemblance to the copper oxide type. Among fundamental differences between them is the fact that direction of easy current flow is opposite in the two types. In the titanium dioxide rectifier, electrons flow from the titanium metal base plate to the counterelectrode.

Mechanism of conduction in the metal oxides is also different. In cuprous oxide the charge carriers are holes or electron vacancies in the lattice, while in titanium dioxide semiconductors, the charge carriers are free electrons. Finally, the barrier layer, or asymmetrical potential that must be surmounted by the charge carriers, apparently is located near the counter-electrode-oxide interface for the NBS type.

Evidence indicates that in the cuprous oxide device the barier is located at the base metal-oxide surface.

"We should have been more careful where we left our Allison Abrasive Wheel"



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Hot Dip Aluminizing Affords Protective Surface

Coating applied by continuous process resists oxidation and scaling at elevated temperatures. Beryllium minimizes oxidation of bath and produces high luster surface

By J. B. RUSSELL
Div. of Metallurgical Research
Kaiser Aluminum & Chemical Corp.
Spokane

HOT dipping is considered to be the most economical means of coating continuously large quantities of sheet or wire, as well as large tonnages of castings and forgings. Furthermore, the end products are considered more versatile from the standpoint of properties and applications.

This means for aluminizing iron and steel has been under development for the past three years. With respect to resistance to oxidation and scaling at elevated temperatures, in normal air atmospheres, aluminized steel will stand temperatures up to 900-1000°F without discoloring and generally up to 1250-1300°F without destructive scaling. Above 900°F, the coating begins to alloy with the steel core by solid state diffusion, and eventually will form a surface layer of iron-aluminum alloy, which is a highly protective refractory layer though of dull appearance.

Unique Process—Basic requirements for a continuous coating have been developed, the steel strip or wire passing through the following steps:

1. Bluing furnace at a temperature of 800-900°F, which serves to degrease the strip and remove all volatile material.
2. Hot muriatic pickling bath.
3. Cold water rinse, hot water rinse, and scrubbing unit.
4. Hot air dryer.
5. Preheat furnace which heats the steel to 1300 to 1350° F and operates under a positive atmosphere of forming gas which is essentially 90 per cent nitrogen and 10 per cent hydrogen.
6. Air-tight turndown chute into the coating bath.
7. Out on the vertical through a cooling tower and then through a roller leveler and upcoiler.

This process is unique in that the pickling bath is relied upon to initially remove all mill scale and oxide from the sheet. The preheat furnace serves mainly to preheat the strip prior to coating and to prevent reoxidation during the preheating operation. Since no significant reduction of oxide need occur in the preheat furnace, it can operate with a low hydrogen atmosphere. The exit end of the turn-down chute is immersed in the aluminum, giving a liquid seal which enables the strip to enter the bath without exposure to air. Turndown chute is also under a forming gas atmosphere.

Salt Furnace — For a larger plant a submerged electrode salt furnace appears most feasible for holding the aluminum bath. In this furnace a salt having a higher density than aluminum is used. By this means, it is possible to float the aluminum bath on top of the molten salt. The salt is heated by resistance of electrical current between the submerge electrodes and the aluminum, of course, would be heated directly by radiation and conduction from the salt.

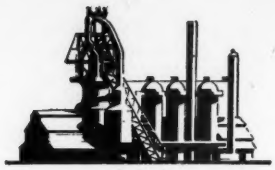
Aside from the inherent ductility of the mild steel core and the outer aluminum coating, the ductility of the composite is governed principally by the thickness and hardness of the brittle interfacial layer. This consists of iron-aluminum or more complex intermetallic compounds formed by diffusion between the coating and the core during the brief immersion in the molten bath.

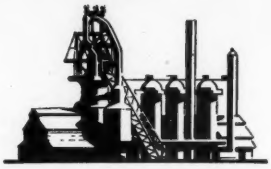
Ductility Controlled—Thickness of the interfacial layer is a function of a composition of the bath, temperature of the bath, and time at temperature. The thickness of the outer layer, which also affects ductility, especially where low bend radii are required, is a function of the fluidity of the bath, which in turn is governed by composition and temperature of the bath, the withdrawal rate, the cooling rate, or the temperature and nature of the environment, and the grain size of the coating.

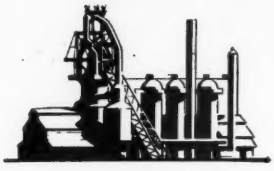
For good ductility, it is important that the interfacial layer be on the order of 0.2 to 0.4 mils. The outer coating may vary from one to three times that of the thickness of the interfacial layer. For good ductility, it is also important that the outer layer not be too thick or too thin. Average ductile coatings are 0.0008 to 0.0012-inch thick, including the interfacial layer.

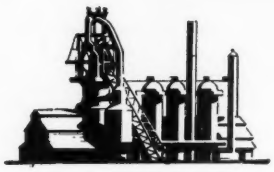
Silicon and beryllium effect this change in interfacial layer thickness. Beryllium also serves to minimize oxidation on the surface of the molten bath and produces a coating of relatively high luster.

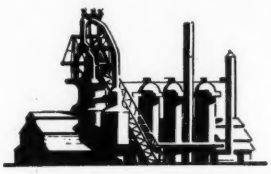
Uniform Coatings—In general, the Al-Be-Si (aluminum-beryllium-silicon) coatings possess the most favorable combination of properties from the standpoint of color, surface texture, ductility and ease of coating. These coatings are re-

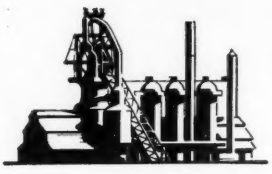


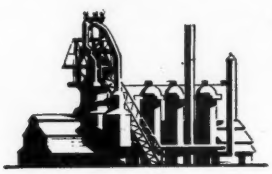












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steel men who have used
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come back for more.

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that you get
satisfactory results
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and construction.

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Headquarters: McKee Building, 2300 Chester Avenue, Cleveland 1, Ohio.
New York Office: 30 Rockefeller Plaza, New York 20, N.Y. • *Washington Office:* 1507 M Street, N. W. Washington, D. C. • *England:* The Iron and Steel Division of Arthur G. McKee & Company is represented by Head, Wrightson & Company, Ltd.
District Engineering Offices: Union, New Jersey and Tulsa, Oklahoma.

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The structural steel experience and facilities of this 56-year old organization are available to you any time, anywhere.

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The world's most widely used material has the ability to withstand enormous pressures and stresses.

UNIFORMITY
Precise specifications and constant chemical and physical tests assure unvaried uniformity.

ADAPTABILITY
Steel frame buildings readily lend themselves to new styles and changing needs which insures long life to structures.

FIRE SAFETY
Steel will not burn. There are no structures more inherently fire-safe than the modern skyscraper, built with a steel frame.

VERSATILITY
The great variety of standard shapes and dimensions enables structural steel to be used for any structural problem.

ERECTION SPEED
Steel frame construction proceeds swiftly because every member is a finished product ready to be placed in the structure.

SALVAGE
Because steel retains its strength and dependability, it can be economically removed for use in new structures and for scrap.

ECONOMY
All these factors combine in saving money for the investor and the owner.

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markably uniform in appearance and far better than usually obtained with the Al-Si and Al-Be alloys. The favorable properties of the Al-Be-Si coatings are more readily reproduced.

At 1300°F, a common operating temperature, aluminizing baths will accommodate, in solution, approximately 2.5 to 2.8 per cent iron. For a given temperature any bath containing iron in amounts above the saturation point in the immediate vicinity of the immersed steel will form intermetallic compound bumps on the surface of the coating.

Iron contents below the saturation point improved the color, smoothness, and luster of the coatings, optimum appearance being obtained with 0.5 to 1 per cent Fe. The effect of iron on ductility varied somewhat with gage of sheet and the alloy.

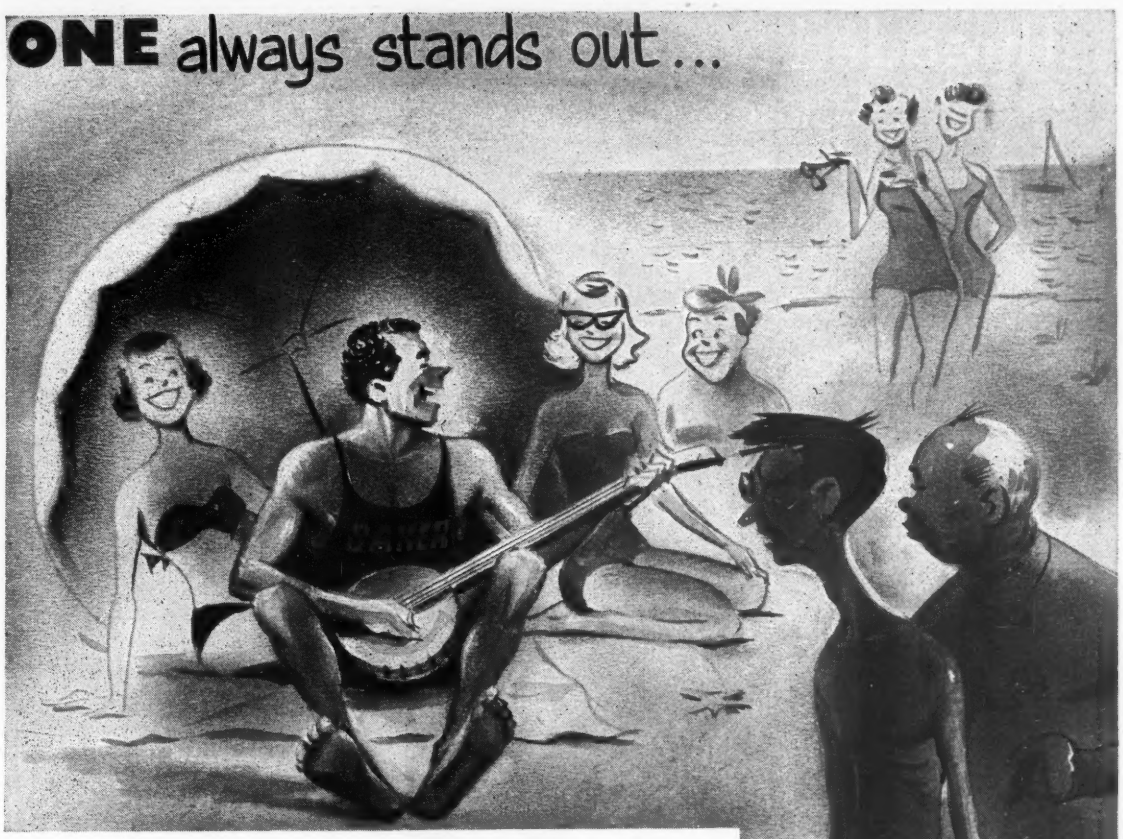
Iron Not Detrimental—In coating 0.01-inch gage sheet, the ductility, in general, was improved by the smaller gage and the presence of iron became less serious. In this case, the Al-Be and Al-Be-Si coatings could accommodate up to 1.7 to 1.8 per cent iron before any increase in ductility was noted. Likewise, more iron could be accommodated in the Al-Si coatings. With respect to corrosion resistance, results indicate that iron in amounts up to approximately 2 to 2.5 per cent does not appear detrimental.

To increase strength properties, it is possible to cold work aluminized sheet or wire by rolling and drawing, respectively. Some alloy coatings will withstand 75 per cent cold reduction by rolling without galling of the outer coating or exposure of the interfacial layer. Likewise, wire has been cold drawn up to 90 per cent providing proper lubrication and dies were used. By these methods, it is posible to regain at least 90 per cent of the original cold drawn properties of the starting material.

In preliminary cupping tests on medium gage sheet, from 25 to 35 per cent elongations were obtained before failure of the coating occurred On thinner gage sheet (0.01-inch), the coatings remained intact to the point where the steel failed by excessive punch load.

From a paper presented at the 1952 Pacific Northwest Metals and Minerals conference, AIME, Hotel Davenport, Spokane, May 8-10.

ONE always stands out...



and among refractory dolomites it's...

BAKER'S MAGDOLITE

SUPERIOR quality is guaranteed by many years of "know how" of The J. E. Baker Company. Continued research means improved refractories whenever improvement is possible. MAGDOLITE'S superior chemical, physical, and mineralogical composition assures properly burned grain-size particles, helping you get more uniform ingots, in greater numbers, at lower fuel costs, with less defective production material. This means better performance for you. Yes, those who know insist on BAKER'S MAGDOLITE... the original Dead-Burned Dolomite!

ALWAYS 5 WAYS BETTER—Composition • Preparation • Strength • Economy • Quality

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Threaded Specialties
to Class 3 Fit

For years Pawtucket has specialized in specialties — of any size, in any metal, to any specifications.

Two items have become widely used because of their lower cost, more accurate fit and greater-than-needed strength. Pawtucket's eye bolts and tee-head bolts are made by an exclusive process that guarantees all these advantages.

For these and any other threaded specialties, save by seeing Pawtucket — "The Bolt Man".

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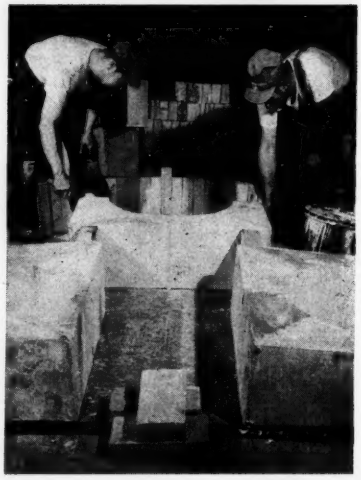
THE PLACE TO SOLVE YOUR BOLT PROBLEMS



Preshaped Furnace Roofs

Timken Roller Bearing Co., Canton, O., reports many advantages to its system of using preshaped silica fire brick for furnace roofs. Bricks are molded at the brick factory to the firm's specifications, then set by six bricklayers in one day. Before, eight men spent five days constructing one roof

Sheet Metal Facilities Shown

Production facilities of the City Auto Stamping Co., Toledo, O., are described in a brochure published by the company.

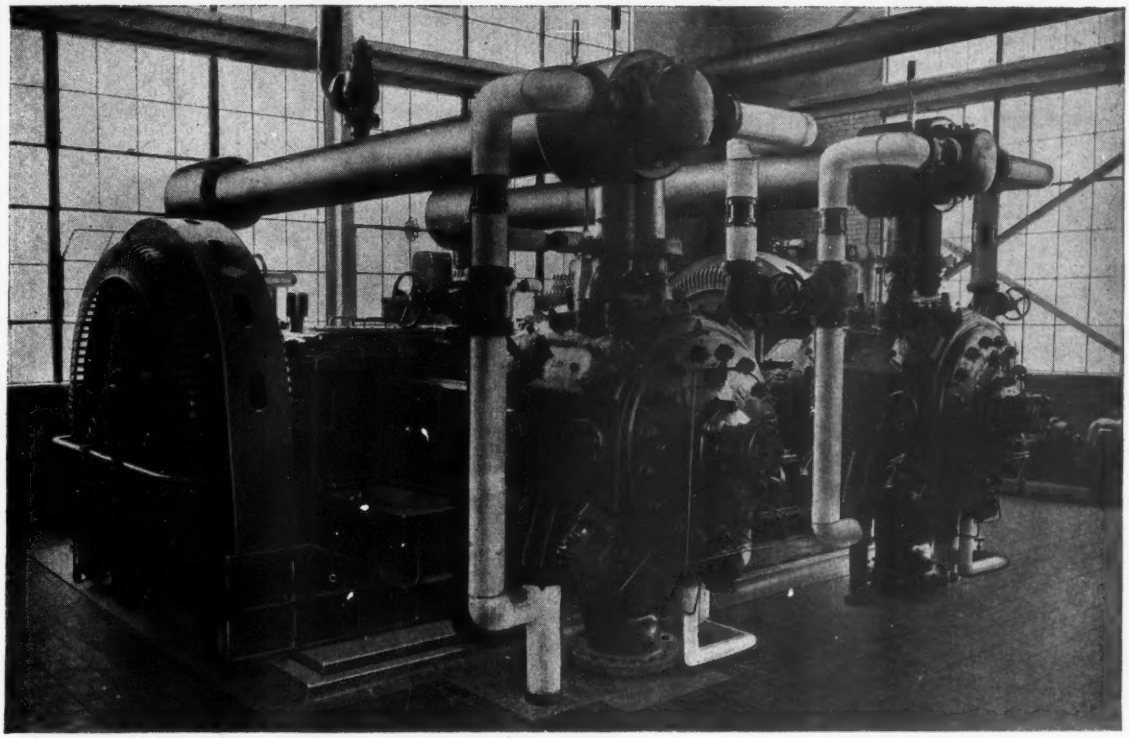
Important items of mechanical equipment include more than 90 presses ranging from small portables to 1200-ton giants. Ample facilities are described for many different types of welding methods.

Other primary equipment mentioned includes roller leveler, square shears, rotary shears, scrap handling conveyor, scrap baler, washing and oiling apparatus, polishing lathes, disk grinders, band saws, drill presses, power hammers and edge wiring machines.

Aluminum Fittings Introduced

New standard-stock line of aluminum tube fittings for industrial applications is produced by Parker Appliance Co., Cleveland. Company reports introduction of its line was dictated by demand for use of the tubing in industrial fluid-handling systems.

Line includes male and female connectors, elbows, T's, union and



Two 600 bhp Clark CRA-2, Balanced/Opposed, synchronous motor-driven air compressors installed on steel framework on second floor of a Michigan auto body stamping plant.

vibration free...

these compressors can operate alongside even the most delicate of equipment

Perfect balance permitted a widely known Michigan auto body stamping plant to mount these two Clark Balanced/Opposed, Motor-Driven Air Compressors on the second floor, near production machines. Long pipe runs, with their attendant pressure drops, were thereby eliminated.

The fact that all vibration has been eliminated from the Clark Balanced/Opposed design permits installation anywhere. *There just isn't any vibration to be transmitted to nearby equipment!* This is especially important in plants having delicate machines and precision operations which cannot tolerate vibration.

Furthermore, with the unusual compactness of the Clark Balanced/Opposed design, it is feasible to install two units side-by-side (as illustrated), enabling greatest possible operating flexibility in meeting the varying air requirements of different plant shifts.

For information on the complete Clark Balanced/Opposed Compressor line, covering 150-4500 bhp, request Bulletin 118.

CLARK®

balanced/opposed COMPRESSORS

CLARK BROS. CO. · OLEAN, N. Y.
Division of Dresser Operations, Inc.
SALES OFFICES IN PRINCIPAL CITIES THROUGHOUT THE WORLD

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- Iron Oilite is an excellent heavy duty bearing material.
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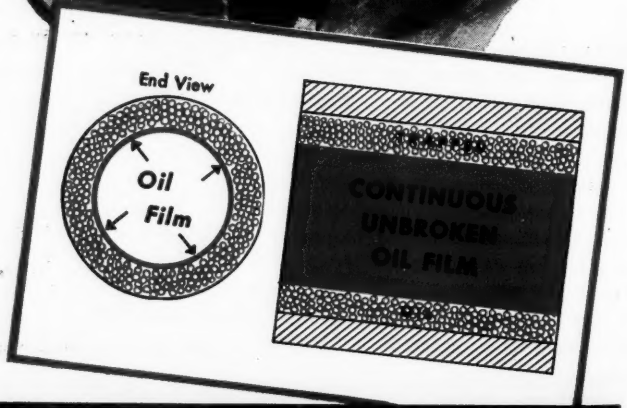
- Iron Oilite bearings provide the acme in lubrication; a continuous, unbroken, oil film, on the bearing surfaces.
- Iron Oilite is available in all types of bearings and over a broad range of sizes.
- Iron Oilite is only one of the famous Oilite family of products created by Oilite powder metallurgy.



AMPLEX MANUFACTURING COMPANY
Subsidiary of Chrysler Corporation
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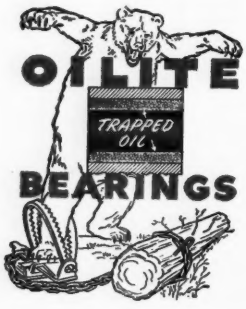

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Oilite Products include:
BEARINGS, Finished Machine Parts, Cored and Solid Bars, Permanent Filters and Special Units in both **NON-FERROUS** *and* **FERROUS** *Metals*

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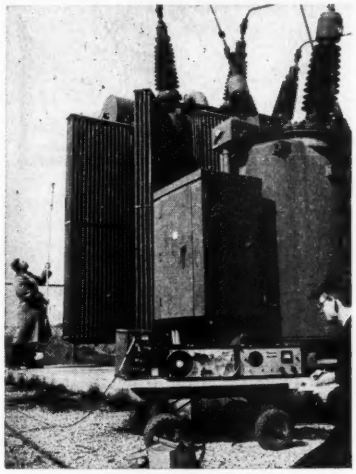
tube end reducers for ¼, 5/16, ⅜ and ½-inch outside tubing. Fittings feature the firm's Triple-lok design.

Noise Recording Simplified

THAT UNNERVING hummmmm that wears down long-sufferers in the proximity of operating transformers is being isolated for study more easily and accurately.

General Electric Co. reports a vastly simplified method used to get the hum into its laboratories involves nothing more tricky than application of the familiar tape recorder.

This is compared with the former practice of lugging cumber-

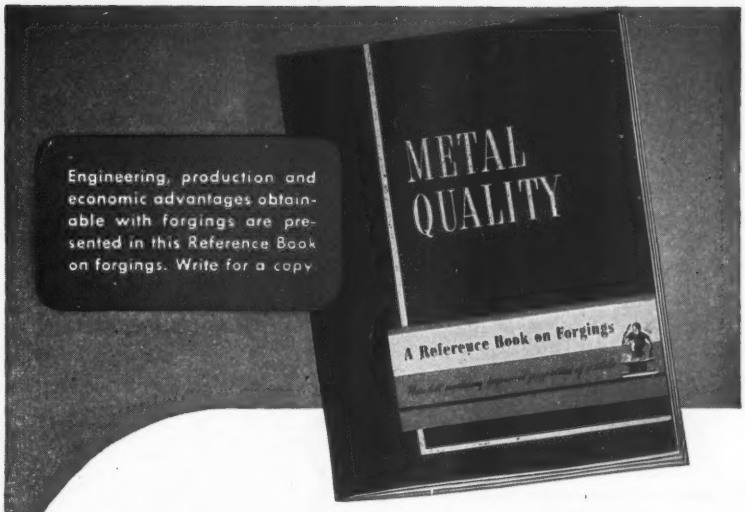


TAPING TRANSFORMER HUM
. . . laboratory analysis comes later

some and complicated instruments to transformer locations. In addition, measurements made at the site were sometimes inaccurate because of the rough treatment and rapid temperature change to which instruments were subjected during transportation.

Compact Replacement—Now the sound analyzer and high-speed recorder are left in the laboratory. In their place a compact high-fidelity magnetic tape recorder, developed by Magnecord Inc., is substituted to gather research material. Engineers at GE's Transformer & Allied Products Division, Pittsfield, Mass., use the data in seeking ways to cut volume.

Under present practice, output of a sound level meter is fed into the tape recorder in 2-minute re-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METAL QUALITY
A Reference Book on Forgings

● Attempts to gain the unusual mechanical and economic advantages of closed die forgings without using forgings seldom meet with success. There is no substitute for the combination of strength and toughness inherent in the compact fiber-like flow line structure of forgings. Consult a Forging Engineer about how you can obtain a correct combination of mechanical qualities in forgings for your particular type of equipment.

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Please send 60-page booklet entitled "Metal Quality — How Hot Working Improves Properties of Metal", 1949 Edition.

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LINDE'S News of Metalworking

Sigma Welding...

A Process with Outstanding Promise

Recently, the country's biggest tank car manufacturer received the largest order for aluminum tank cars ever issued — ninety-eight tank cars on a single order. This order was obtained only because of the development of a fully automatic welding process . . . shielded inert gas metal arc welding — sigma welding.

This welding process has made double-vee butt welds at 5 in. per min. in 1-in. material. Structural welds have been made at 48 in. per min. in ¼ in. plate, and as high as 200 in. per min. on 1/16 in. material.

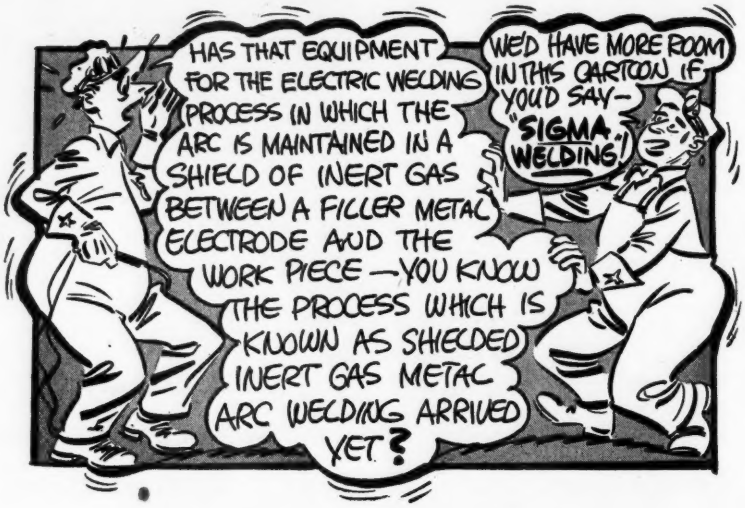
Prior to the development of sigma welding, fabricating aluminum tank cars was a slow hand process. In order to weld the heavy plates used in making the cars, as many as six passes were required.

With an automatic sigma welding setup, X-ray quality welds in the ½ to 1¼ in. thick aluminum plates are made at speeds of from 6 to 15 in. per minute. And only 2 passes, one inside and one outside, are required to get perfect penetration. High current densities used in sigma welding result in narrow welds with deep penetration.

Sigma welding is fast becoming an important fusion welding method. It has not only replaced many other welding methods, but has permitted fabrications hitherto impracticable for welding.

Just recently, a metalworker adopted this process for welding an aluminum-bronze valve seat to a mild steel tube . . . sigma welding proved to be the only practical method he could use for this work.

Another shop built their first *aluminum tank using sigma welding* . . . The large tank was finished so quickly — work progressed without stopping — that the shop will replace all other welding methods with sigma welding. Excellent welds *requiring little finishing* were obtained in the ½ in. aluminum plates.


HAS THAT EQUIPMENT FOR THE ELECTRIC WELDING PROCESS IN WHICH THE ARC IS MAINTAINED IN A SHIELD OF INERT GAS BETWEEN A FILLER METAL ELECTRODE AND THE WORK PIECE — YOU KNOW THE PROCESS WHICH IS KNOWN AS SHIELDED INERT GAS METAL ARC WELDING ARRIVED YET?
WE'D HAVE MORE ROOM IN THIS CARTOON IF YOU'D SAY — "SIGMA WELDING"!

New Processes Need New Names

The cartoon shows just about the way it started . . . Shielded inert gas metal arc welding was quite a mouthful to say when describing or referring to the process. It also required a lot of space in written material.

Then someone said sigma welding. It was easier to say.

Sigma is a good word, too. Each of the letters is an initial letter of the words: shielded, inert, gas, metal, and arc.

This easy-to-say word, sigma, is now used to describe the process. It is not a trade-marked word, and is used in the same sense as oxy-acetylene welding, gas cutting, or brown dog — just like any other descriptive adjective.

Metals Being Joined by Sigma Welding

Sigma welding can be used on practically all commercial metals. Railroad tank cars, chemical and food processing tanks, pressure vessels, and brewery equipment are only a few applications where the process is being used economically. Here's a quick look at some of the metals being joined by this process:

Aluminum . . . All weldable grades including 3-S, 50-S (150-S), 52-S, 61-S, and the commercially pure 2-S alloy are being welded with excellent results . . . These alloys are being machine welded in thicknesses ranging from 0.50 in. to 1.50 inch . . . Hand welds are made in material ⅛ in. and thicker . . . Maximum thickness that can be welded is unlimited with multi-pass technique . . .

Stainless Steel . . . Sound X-ray quality butt welds have been obtained in thicknesses ranging from ⅛ to ½ inch . . . Quite evident that heavier thicknesses can be welded . . . Results of tests show that welds possess good tensile strength, elongation, and impact resistance . . .

Copper . . . Sound butt, fillet, and corner welds have been made in ⅛ in. and ¼ in. deoxidized copper.

Everdur . . . Butt welds made in ⅛, ¼, and ½ in. thick materials are sound, smooth, and without cracks or undercutting. Tests showed that bend and tensile specimens have excellent properties.

Carbon Steel . . . Sound machine butt welds have been made in ⅛ in., ¼ in., and ½ in. thick killed and semi-killed carbon steels . . .

Aluminum Bronze rod has been deposited on mild steel with excellent results . . . Wear resistance greatly improved . . . Other surfacing and buildup operations very successful . . .

LINDE'S Apparatus for Sigma Welding

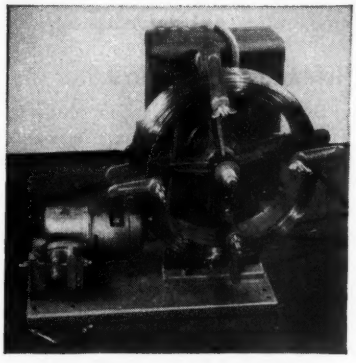
Here is LINDE's sigma apparatus for either machine or hand-welding. It provides automatic operation, accurate and uniform control of rate of rod feed, easy handling, and simplicity of operation . . . Everything to help you make X-ray quality welds at high speeds.

Hand Torch Designed for Easy Handling

The LINDE HW-11 Torch is designed for sigma hand-welding. It is lightweight, and pistol-shaped to provide a convenient grip and easy handling. The gas cup and torch power cable are water-cooled for protection from overheating. All hoses to the torch are bound together in a synthetic rubber sheath which is highly flexible.

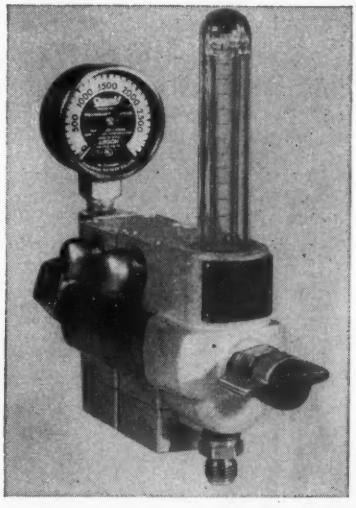
The rated capacity of the torch is 400 amp. when cooling water flow is 1 qt. per min. at inlet temp. of 60 deg. Fahrenheit.

Simple Assembly Controls Rod Feed



LINDE's Rod Feed and Control Assembly for hand-welding, automatically controls rod feed at all times. Rod is fed at a constant predetermined speed which is regulated by an electronic governor. Rate of rod feed depends on the current and material being welded, and can be easily adjusted by a potentiometer. A rough initial setting for the potentiometer is determined from welding data tables. After the arc is struck, the operator can adjust the potentiometer, if necessary, to get a steady, smooth arc. Welding is then done without any further adjustments.

Argon Regulator Assures Uniform Gas Flow

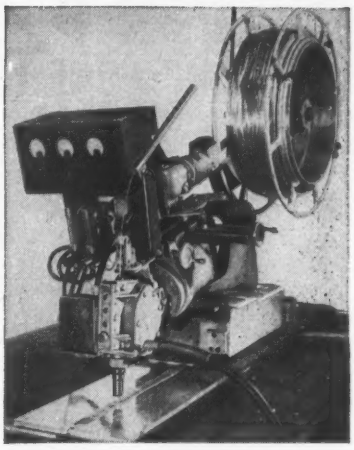


The OXWELD R-502 Regulator, designed specifically for inert gas welding, reduces the pressure of the argon stored in the cylinder to the working pressure needed. One simple setting adjusts it to supply the torch with the correct rate of argon flow required for the work at hand. A built-in flowmeter and throttle valve always show the flow of argon used. The indication is always true, and is not affected by the pressure drop between the valve and the working end of the torch.

Machine Welds Made at High-Speed with the FSM-1

LINDE's FSM-1 machine makes clean, smooth welds. Welding is fast and weld quality high. Almost any metal thickness can be welded by a suitable number of passes.

The FSM-1 is recommended for welding long seams, or for work that is fairly repetitive. The welding head can be positioned for practically any work requirement. It has provisions for vertical and lateral adjustments in two planes for the angle at which the welding rod is fed into the weld zone. Retract starting provides for starting the arc quickly and conveniently.



LINDE Argon (99.92% pure), and Sigma Grade

For welding stainless and carbon steels, LINDE argon — sigma grade, a mixture of oxygen in argon, speeds metal deposition. It permits welding at high speeds without undercutting, improves coalescence of the weld metal, and makes overhead welding of stainless steel practicable.

For those metals requiring a pure argon gas, LINDE offers standard welding argon that is 99.92 per cent pure. This high purity makes it the best all-around shielding gas.

For further information about LINDE's equipment for sigma welding, please contact any LINDE office.

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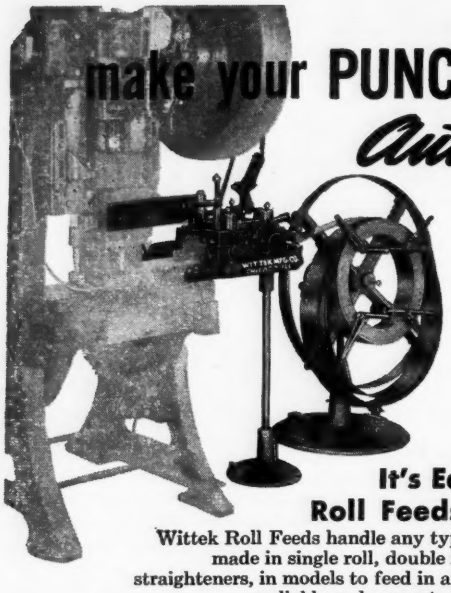

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It's Easy...with WITTEK Roll Feeds and Reel Stands

Wittek Roll Feeds handle any type of coiled strip stock and are made in single roll, double roll, and compound types with straighteners, in models to feed in any of four directions. They are reliable and accurate with simple, quick adjustment of feed length. Standard sizes and models meet a wide variety of press size and capacity conditions.

Wittek Reel Stands facilitate handling coiled stock.

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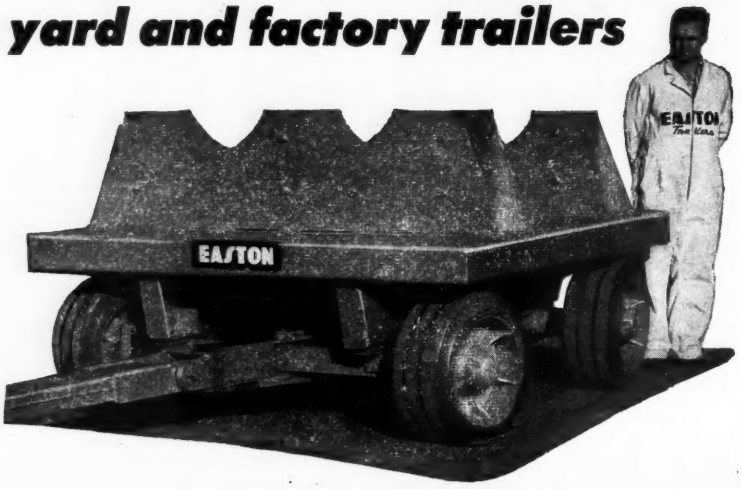
heavy-duty dependability in yard and factory trailers



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Portable Tester

HARDNESS readings with a pocket-sized, 7-ounce tester are done at the point of work. Tests can be made on a work piece while it is in the machine —no need to carry work to the gage.

Tests are made on the rebound principle and little surface damage results. For parts weighing less than 15 pounds a clamping anvil is supplied to provide enough mass to give a full rebound. On work weighing more than 15 pounds anvil is not necessary.

Direct readings are given on any of three different scales without use of conversion charts. Manufacturer is Peabody Industries Inc., New York.

cordings made at various microphone locations. Significant technical data is recorded verbally with each pick-up. The microphone is used also to pick up a standard sound at intervals of about 15 minutes for calibration purposes.

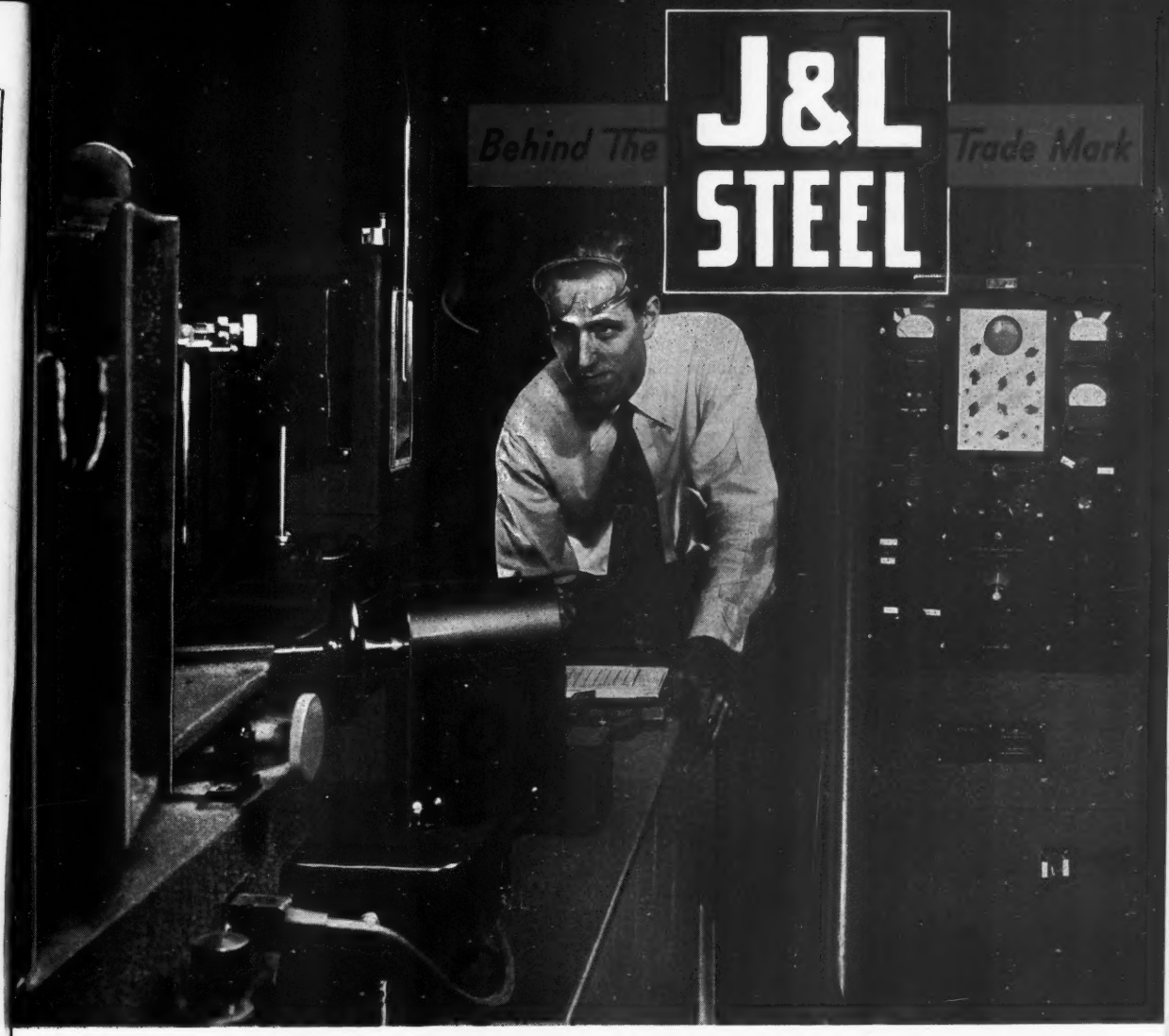
Subsequent Analysis—Result is a permanent record of transformer noise, with pertinent field data, that can be analyzed subsequently under ideal lab conditions. Company engineers say tape pick-up in field work has an added advantage of permitting subjective analysis of less tangible aspects of apparatus noise.

These include judgments of the annoyance factor, made through playbacks in the present of known amounts of ambient noise.

Heid Lathe Offered in U.S.

Sensitast copying lathe, made by Heid, Vienna, Austria, is being marketed by Cosa Corp., New York. Machine's copying device, controlled by electromagnetic clutches, makes 90-degree cuts on left or right side of a workpiece. To obtain a high degree of finish, a feed reducer with magnetic clutch is employed.

Inverted v-ways, filled with oil at all times, and lead screw and rack are inside the bed and covered with telescopic steel plates for protection against chips and dirt. Tailstock, steady rest and template are supported on vertical ways at the rear. This permits



How "Excited Atoms" Insure Correct Steel Analysis

HERE'S the quick, modern way J&L chemists make sure steel contains the exact amounts of certain elements specified on the customer's order.

First, a polished sample of the steel being analyzed is placed in this electronic apparatus called a "spectrograph." The sample acts as an electrode and creates an arc. The atoms are excited by the arc and throw off a beam of light.

The light rays, passing through a prism, are separated into various wave lengths and are photographed as separate fine lines on film.

Each element appears on the developed film in its own characteristic density of line. Another instrument, the "densitometer," measures the line density, which the chemist quickly calculates into percentage.

The spectrograph analysis, done in a few minutes, assures the customer that his steel is made to the analysis he specified.

It's just one of the many functions of Jones & Laughlin Steel Corporation quality control, going on constantly behind the J&L trademark, to insure the quality of steel in better products for you.

JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH 30, PA.

tailstock to pass over the saddle without interference. Lathe has 17-inch swing over cross slide, 28 inches over saddle and 37 inches over bed cover.

Sheets Separated Automatically

Frustration experienced in trying to pry oily steel sheets apart with hands or a sharp instrument may soon be a forgotten experience. Clark-Hopkins Equipment Corp., Philadelphia, has developed a sheet separator that works automatically to separate the top sheet from a stack.

Among benefits to be gained Clark suggests its separator will reduce the danger of operators receiving cut hands or bashed in fingers as a result of their struggles with the unyielding stack. The company reports considerable time savings have resulted in many applications.

Top sheet is raised about 2 inches above the balance of the stack. As each sheet is removed, the next is raised and separated—ready for immediate transfer. Separators are used singly or in pairs, depending on size of material to be handled. Four sizes are available: 6½, 9, 10 and 15 inches.

When it comes to production-come to Hartford Special

NEW Larger Size – Greater Capacity

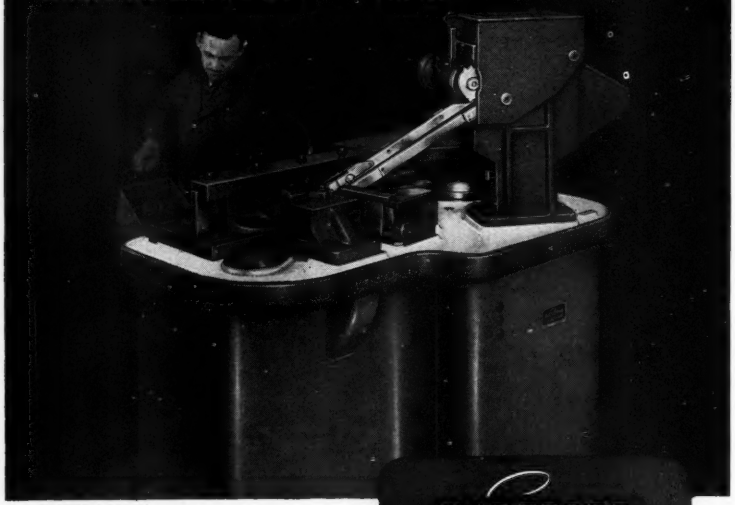
AUTOMATIC THREAD ROLLER

MODEL A-312-H

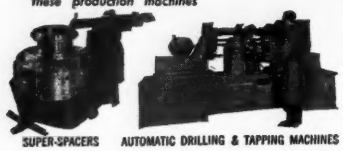
The Hartford Special Model A-190 Automatic Thread Roller has now been on the market for more than three years. During this time it has met with universal satisfaction from its many users, and this favorable reception and experience by the trade has naturally influenced us to design and develop a larger capacity machine.

NOW HARTFORD SPECIAL ANNOUNCES the new Model A-312 Thread Roller which takes machine screws up to 5/16" diameter by 2½" long at a production rate up to 140 pieces per minute dependent upon screw size.

If you roll threads, write for Bulletin TR-312-100.



Hartford Special also makes these production machines



SUPER-SPACERS AUTOMATIC DRILLING & TAPPING MACHINES

HARTFORD Special

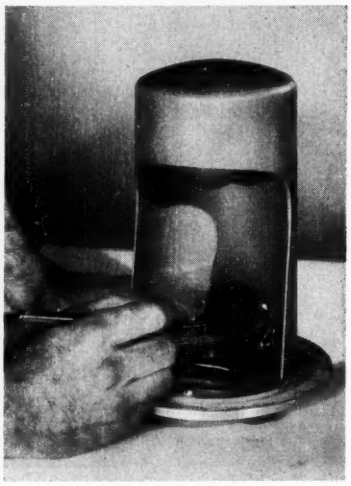
THE HARTFORD SPECIAL MACHINERY CO.
HARTFORD 12, CONNECTICUT

Metal Is Abraded

Abrasive blast cuts hard metal with less heat generated in the process

METALCUTTING with a high-velocity stream of gas-propelled abrasive particles is the system used with the new Airbrasive unit developed by S. S. White Industrial Division, Dental Mfg. Co., New York.

Abrasive material is generally aluminum oxide, specially prepared. Propellant usually used is carbon dioxide. Any other dry inert gas can be used however.

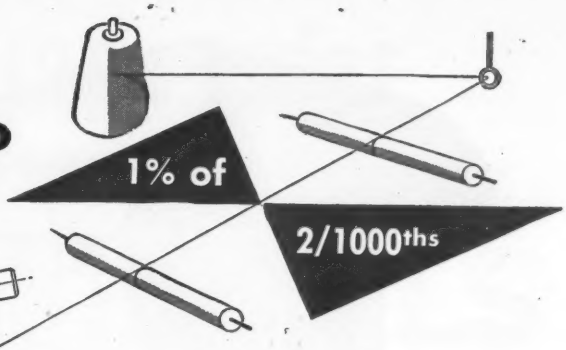


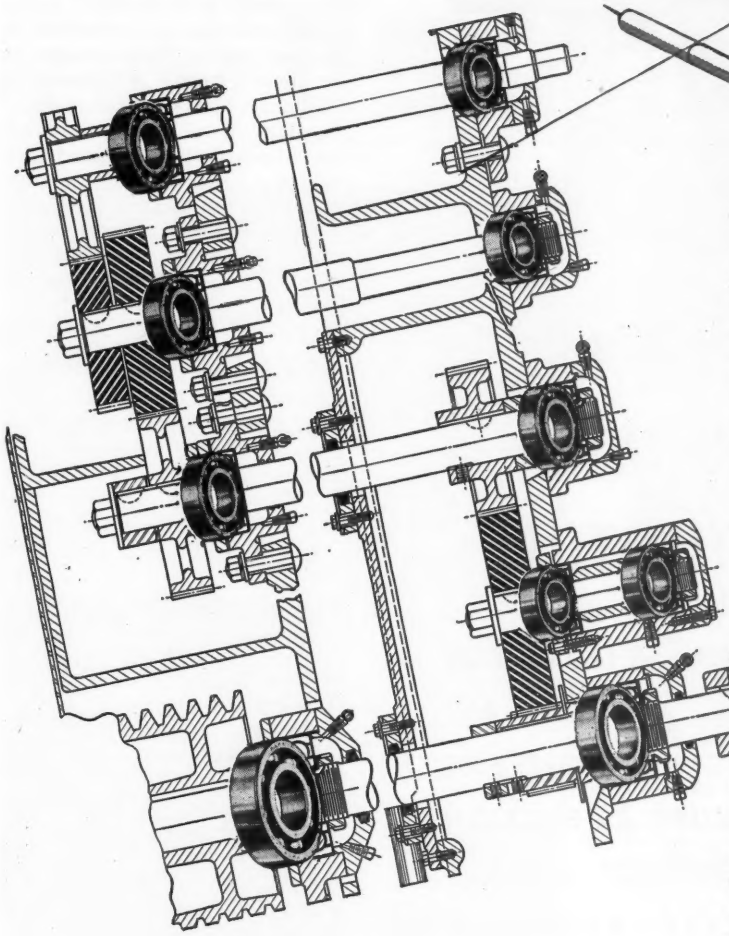
WIDTH OF CUT
. . . nozzle distance controls it

Less Heat — Cutting action of the unit is accomplished without the usual increase in temperature experienced with other cutting methods. Another advantage is that there is no direct contact of a cutting tool with the surface that is being worked. This eliminates dimensional variations that would be created by wear of a standard cutting tool or by surface irregularities of the work.

Stream leaving the nozzle travels at about 1100 fps and is only 0.018-inch in diameter. Despite ease with which it cuts hard and brittle surfaces the unit has prac-

SETUP
that holds tolerance to





If you are familiar with machine designing, you'll consider this a "neat" piece of engineering. Such precision is actually achieved on mammoth synthetic thread twisters developed by Whitin Machine Works. The twisters stretch thread to a uniform .002 of an inch diameter and hold that diameter to within a 1% tolerance down a 40 foot line of spindles.

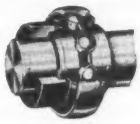
A sectional view of the head end which controls the "feed rolls" and "draw rolls" shows the Fafnir Ball Bearing setup that helps to keep their relative velocity absolutely constant . . . a "must" to produce such an amazing degree of accuracy. The Extra-Precision ball bearings used are made by highly trained operators on special equipment controlled by elaborate inspection devices.

Whatever your bearing problem, a few minutes spent with a Fafnir representative may help you solve it equally as successfully. Fafnir's experience is not limited to just a few industries . . . it's industry-wide. The Fafnir Bearing Company, New Britain, Conn.

Bearings used
Fafnir Extra-Precision Ball Bearings of the 200 (Light) and 300 (Medium) Series are shown in the ten locations above.

Standard Radial Ball Bearings

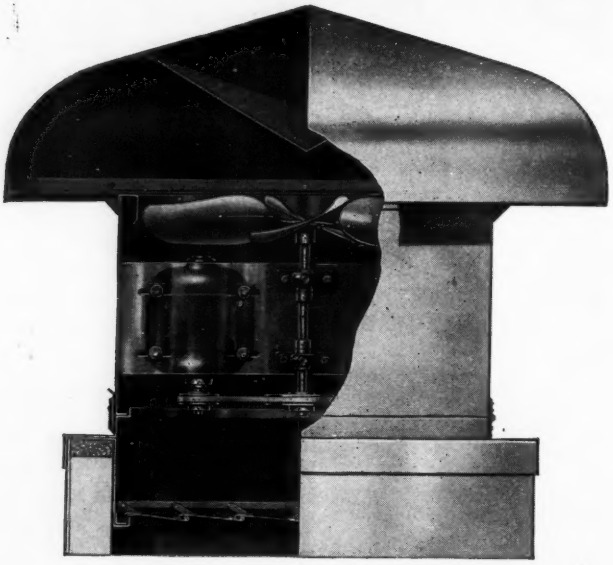
Power Transmission Units . . . all types and sizes



Wide Inner Ring Ball Bearings with Mechani-Seals

FAFNIR
BALL BEARINGS

MOST COMPLETE LINE IN AMERICA



BURT LOW TYPE FAN VENTILATOR

MAY BE USED AS AN EXHAUST FAN VENTILATOR OR AS A FRESH AIR SUPPLY UNIT • HIGHLY EFFICIENT BIG CAPACITY • QUIET OPERATION COMPLETELY WEATHERPROOF • EASILY INSTALLED • QUICKLY ACCESSIBLE

The new Burt Low Type Fan Ventilator meets today's architectural requirements for low functional design that is inconspicuous when installed. Its highly efficient performance and easy maintenance recommend it to plant engineering personnel. Standard sizes include fans from 12" to 60" diameters. Fans may be direct motor driven or V-belt and pulley drive. Automatic or motor operated louver-type dampers may be used. See Sweet's for complete data or write us for Burt LOW TYPE FAN VENTILATOR Bulletin SPV-16.

FAN & GRAVITY VENTILATORS • LOUVERS • SHEET METAL SPECIALTIES

The Burt Manufacturing Company

905 So. High St. Akron II, Ohio

tically no effect on resilient or soft materials, such as rubber, cloth and certain types of plastics. Likewise it will not damage skin tissue.

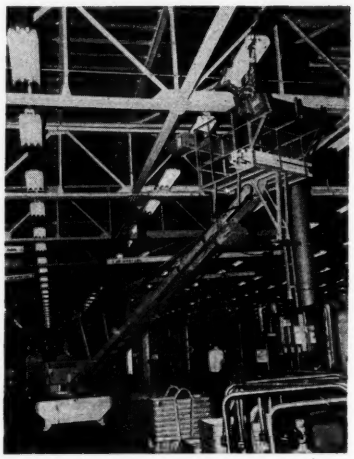
Rich or Lean — Controlled and variable mixture of abrasive particles and propellant gas is obtained with a special mixing chamber mounted on a vibrator. Action of this vibrator is controlled by the feed control knob mounted on the control panel. Adjustment of this handle regulates voltage across the vibrator and consequent vibration is increased or decreased. This creates a richer or leaner mixture of abrasive in the air stream.

Stream is applied either manually or, for production purposes, the nozzle can be held in a fixed or automatically operated jig.

'Boom' to Maintenance

MAINTENANCE boom at Caterpillar Tractor Co.'s new plant in Joliet, Ill., is simplifying and speeding a tedious task.

A 6000-pound capacity Yale electric crane truck equipped with a new type articulated platform

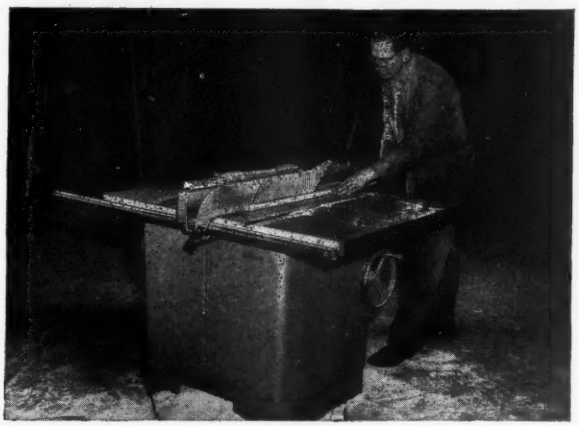


REACHING OVERHEAD EQUIPMENT . . . *difficult by conventional means*

is used for faster, easier maintenance of lighting and other overhead equipment. Crane can position the boom and platform for overhead work above machine tools and other obstacles. It puts men on the job in locations difficult to reach by other means.

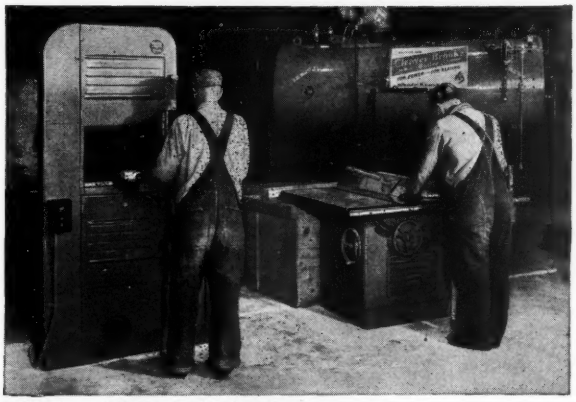
Positive Linkage — Maintenance man and material are picked up by lowering the boom until the plat-

HOW three companies whip crating and maintenance costs by using DELTA TOOLS



Delta 12" Tilting Arbor Saw Has Needed No Maintenance
. . . at Crompton & Knowles Loomworks, Worcester, Massachusetts

Each power loom built for export shipment presents an individual crating problem; and the "hub" of that major wood-cutting operation is a Delta 12-inch tilting arbor saw. It rips random-width lumber to proper sizes for the individual crates. The main body of each loom reaches the crating shop bolted to a wooden frame, exactly as it will be bolted to the floor later on. It is then braced to prevent shifting, and a box is built up around it. This is covered with moisture-resistant paper, and the outer box is then formed. *The Delta saw has been in use well over four years; maintenance—none.*



Delta Saws Solve A Crating Problem
. . . for Cleaver-Brooks Company, Milwaukee, Wisconsin

Problem: Steam boilers—massive yet delicate equipment, ranging from 15 to 500 HP and up to more than 40,000 pounds—are subjected to excessive jolting and to long exposure to elements during transit by rail and overseas. Costs of crating to provide complete protection were extremely high . . . **Solution:** Working from blueprints and precutting by two Delta saws—a 12" tilting arbor saw to cross-cut, rip and miter-cut lumber from crating boilers of various sizes, and a 20" band saw to cut inner bracing and support members.
Result: *An immediate big slash in crating costs.*

Delta Radial Saw Has Paid for Itself Many Times
. . . for California Valencia Juice Co., Chicago, Illinois

"Our Delta radial saw cuts to length, rips, miters and double-miters the oak lumber used for partitions, sliding doors, work benches, cabinets, docks, and many other items. Using our own unskilled help, it takes less than the time needed to explain jobs to a carpenter," says Elmo Delgrano, owner. "We built hundreds of pallets for handling multi-case unit loads; 60" x 30" bottle trays; and 64" x 34" four-wheel trucks at $20 each for which we'd have to pay at least $60. *The saw costs $1.70 an hour to operate (including labor), has saved us countless hours, and has paid for itself many times over."*

Another Rockwell Product

There's a Delta Power Tool for Your Job

WOOD OR METAL WORKING

53 Machines • 246 Models • More Than 1300 Accessories

DELTA POWER TOOL DIVISION
DELTA MILWAUKEE **Rockwell**
MANUFACTURING COMPANY
638G N. LEXINGTON AVE., PITTSBURGH 8, PA.

WHICH OF THESE QUALITIES DO YOU WANT MOST IN CUTTING FLUID?

. . . . LUBRICITY
—to withstand pressure and reduce friction

. . . . VERSATILITY
—one cutting fluid to do 90% of all jobs

. . . . GERMICIDAL PROPERTIES
—no skin sores, no rancid odors

. . . . FILM STRENGTH
—which gives you longer tool life

. . . . COOLER WORK
—which can be handled bare-handed

. . . . LOWER COSTS
—less than 8¢ a gal., in the machine

YOU GET THEM *ALL* WITH

ANTISEP

ALL-PURPOSE BASE

—not a mere water soluble oil, but a fortified concentrate scientifically developed to give you "100 oils in one!"

PROMINENT AUTOMOTIVE MANUFACTURER MAKES 25,000 PIECE TEST... *Result...*

ANTISEP by wide margin!

Test consisted of broaching 25,000 pieces of SAE 1138 steel at a feed of 18 feet per minute, on a Cincinnati Broach. Antisep was diluted 15 to 1 with water. Competitive Oil "A" was used in a mix of 18.5% oil, 81.5% Paraffin; Oil "B" was also mixed with Paraffin on a 23.7% to 76.3% ratio. The cost comparison below shows Antisep's exceptional economy . . .

	OIL "A"	OIL "B"	ANTISEP BASE
Coolant	$45.70	$54.20	$14.80
Sharpening and Setup	26.80	27.49	26.26
Tool	139.69	137.55	134.76
Total Cost	$212.19	$219.24	$175.82

E. F. HOUGHTON & CO.
PHILADELPHIA · CHICAGO · DETROIT · SAN FRANCISCO

Ready to give you on-the-job service . . .

One-Step Analysis

RAPID, one-step procedure for determining copper in alloy steel, developed by National Bureau of Standards, does the job in about 30 minutes.

The bureau says its a photometric method in which the steel sample is first dissolved in dilute nitric acid (for high-chromium steels, a mixture of nitric and hydrochloric acids is used). A sulphuric - phosphoric - perchloric acid mixture is added, and solution evaporated until fumes of sulphuric acid are given off.

Use of sulphuric-phosphoric acid mixture provides for the complete solution of tungsten tool steels. The solution is then diluted and, after addition of citric acid, is made slightly ammoniacal. The sodium salt of ethylenediaminetetra-acetic acid is added as a complexing reagent, and sodium diethyldithiocarbamate is also added to form a copper complex. Latter is extracted with butyl acetate, and the butyl acetate extract is washed with diluted sulphuric acid to stabilize the complex. The optical absorbancy of the copper diethyldithiocarbamate complex in the butyl acetate layer is measured in a colorimeter at 560 to 600 millimicrons, and amount of copper is read from a calibration curve or table.

form rests on the floor. Positive mechanical linkage on the boom keeps the platform parallel with the floor at all times, regardless of boom elevation. For maximum coverage from a given aisle location, the boom can be extended to lengths up to 19 feet and swung in a 270-degree arc.

The same crane truck also is used for outdoor maintenance work. Here, it can reach from the street over grass and sidewalks to service the company's lighting equipment.

Tool Works Cylinder Blocks

Special machine tool for producing V-8 cylinder blocks has been completed by Cross Co., Detroit. Tool drills, bores, spotfaces and reams 120 blocks per hour at high per cent efficiency.

Design shows a total of 19 stations. One is used for loading; ten

RBC's New Concept! New Product!

PITCHLIGN TRADE MARK ROLLER BEARINGS

An entirely new principle of bearing construction! RBC's PITCHLIGN cage keeps the rollers in perfect alignment by contact at the roller *pitch circle*. Rollers cannot cock or skew!

Internal stresses are reduced to an absolute minimum in PITCHLIGN bearings because the cage acts *only* in the direction of rotation at a point coincident with the roller orbit. Again, accumulated tolerances or wear of load carrying surfaces have no effect on the overall efficiency of the cage, since it is supported by the two integral flanges of the heavy outer race.

PITCHLIGN is not merely an improvement on a standard type bearing—it represents an entirely *new concept*, developed in an entirely new product . . . dimensionally interchangeable with precision needle bearings.

PITCHLIGN's performance potential can save you time and money. Get The Facts!

Write Today *Ask for Bulletin SF-566*

RBC

ROLLER BEARING COMPANY OF AMERICA • TRENTON N. J.

HELP YOURSELF...to TWO

In the hands of the CARBORUNDUM engineer, the new "61" Port-A-Belt Grinding Attachment...on the desk, the new "T-61" Hub Wheel assembly

Look to CARBO

TRADE

"Carborundum" and "Port-A-Belt" are trademarks of The Carborundum Company, Niagara Falls, New York

BRAND-NEW abrasive ideas!

Within the past thirty days, two entirely new concepts in grinding have been brought to you through CARBORUNDUM engineering. Backed by long months and years of design and development work, these new techniques are now ready to go to work, earning a bigger profit for you.

You can profit by both of these brand-new developments—for they have been created with just one purpose in mind... to cut your grinding and polishing costs to the bone. Both new products happen to apply to abrasive *belt* performance—the "61" Port-A-Belt which now makes portable belt grinding a reality—the "T-61" Hub Wheel which can cut contact wheel replacement costs in half. Next month, the headline development might be a new abrasive *wheel.* That's the tremendous and exclusive advantage you enjoy in doing business with CARBORUNDUM. Offering *all* abrasive products, we have just one axe to grind... yours!

You benefit when you call in your CARBORUNDUM or distributor salesman on any abrasive problem you have. Nowhere else can you get the unbiased counsel you have a right to expect. You'll find him listed in the yellow pages under "Abrasives." Call him today—it's to your profit!

Here are only a few of the 30,000 reasons why you get the RIGHT combination of abrasive and method only from CARBORUNDUM

RUNDUM

MARK

for the NEW developments in ALL abrasive products

PREVENTIVE MAINTENANCE

eliminates truck downtime

READY-POWER IS *BEST* FOR PREVENTIVE MAINTENANCE

Tie up a truck because of power failure? Never! Equip your fleet with *interchangeable* Ready-Power gas-electric units and, then, have one extra for the shop. Thus, power units can be rotated for preventive maintenance . . . and your trucks stay *on the job* . . . where they belong.

Remember...Your Truck Is No Better Than Its Power!

CONTINUOUS-DUTY POWER UNITS

The READY-POWER Co.

3824 Grand River Ave., Detroit 8, Michigan

Manufacturers of Gas and Diesel Engine-Driven Generators and Air Conditioning Units; Gas and Diesel-Electric Power Units for Industrial Trucks

for drilling, boring, reaming, spotfacing and countersinking; two for gaging; one for cleaning; four are idle; and one is used for unloading. Locating, clamping, positioning and transferring are all done hydraulically.

Company's tool control unit is incorporated to stop the machine automatically when tools need changing. Preset tools are applied to reduce downtime and decrease tool breakage.

Lathe Cuts Handling Time

American-built Swiss type copy lathe features automatic cycle and easy chip removal

AMERICAN rights to the Swiss copying lathe of George Fischer Ltd., have been issued to the New Britain Machine Co., New Britain, Conn. This lathe (STEEL June 9, p. 139) has the carriage suspended on horizontal ways located one above the other.

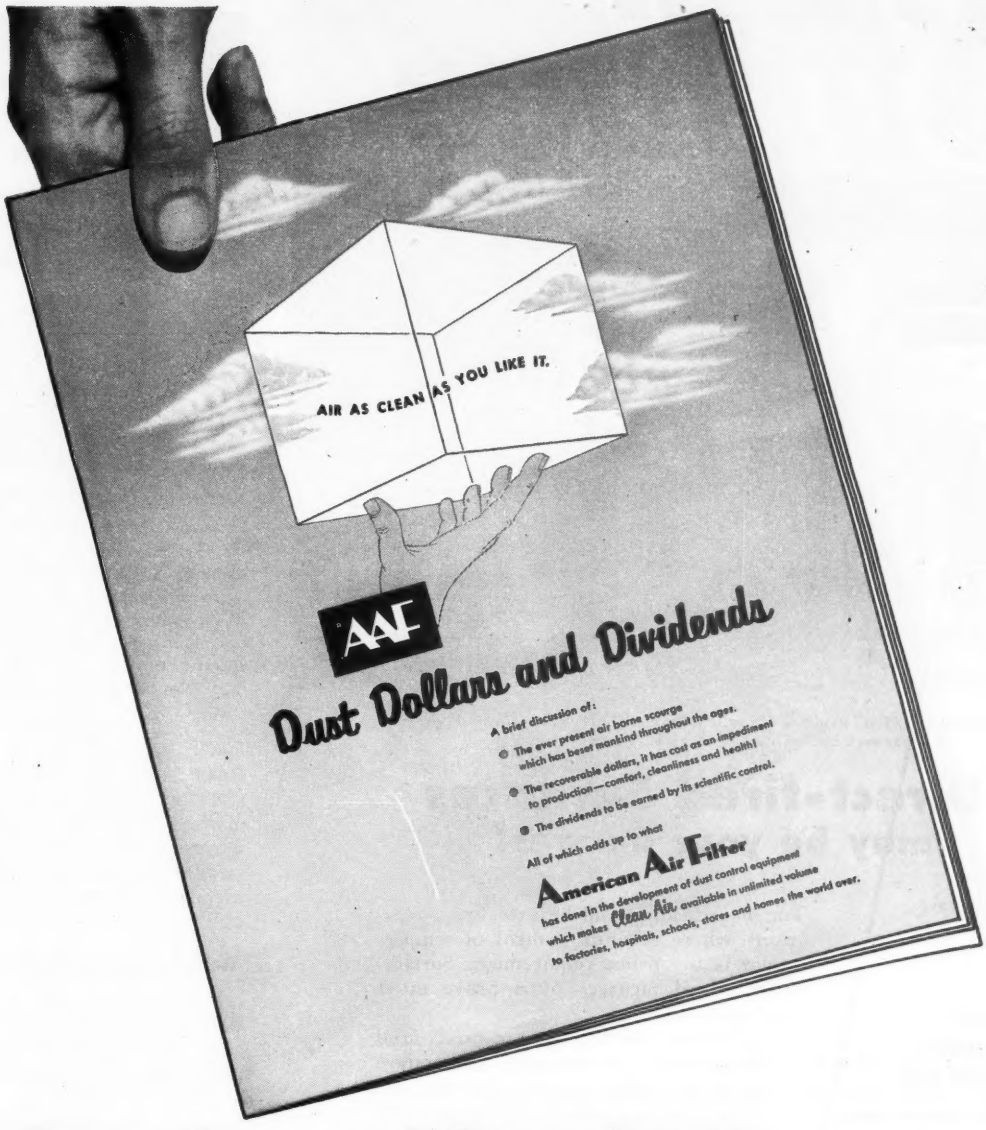
Entire hydraulic system is enclosed in the carriage. There are no outside pipes or rubber tubes. Same oil which operates several of the hydraulic mechanisms also lubricates the feed gears and the copying slide.

Capacity—Maximum turning diameter is 8⅞ inches or 14 inches depending on the model selected. Maximum turning length is 100 inches for the large machine. Motor horsepower is either 20 or 25.

Machine features an automatic cycling system which reduces handling time and provides maximum cutting efficiency. Tool approach is hydraulic and the depth of cut is set with stops. At the end of each cut the tool is drawn back, returned in rapid traverse to its starting position and approached for the next cut. After last cut, retraction and return are automatic. As a result the operation can be complete including both roughing and finishing cuts.

Let the Chips Fall—Chip removal is facilitated by the bed construction. Chips simply fall down through the open space below the cutting operation to the floor or into a chip pan. Removal from the rear does not interrupt the continuing operation of the machine.

Other features include: A power operated tailstock which permits operator to use both hands for


AIR AS CLEAN AS YOU LIKE IT.
AAF
Dust Dollars and Dividends
A brief discussion of:
The ever present air borne scourge which has beset mankind throughout the ages.
The recoverable dollars, it has cost as an impediment to production—comfort, cleanliness and health!
The dividends to be earned by its scientific control.
All of which adds up to what
American Air Filter
has done in the development of dust control equipment which makes Clean Air, available in unlimited volume to factories, hospitals, schools, stores and homes the world over.

for Executives and Consultants...

AAF now offers this new book, "Dust, Dollars and Dividends". With case histories and illustrations it tells the dramatic story of air pollution, the problems it creates in our economy, and their profitable solution.

Write us today for your *free* copy.

American Air Filter Company, Inc. J
215 Central Avenue
Louisville 8, Kentucky

Please send me your new booklet "Dust, Dollars and Dividends" . . . the dramatic story of dust, its problems and their profitable solution.

NAME_____

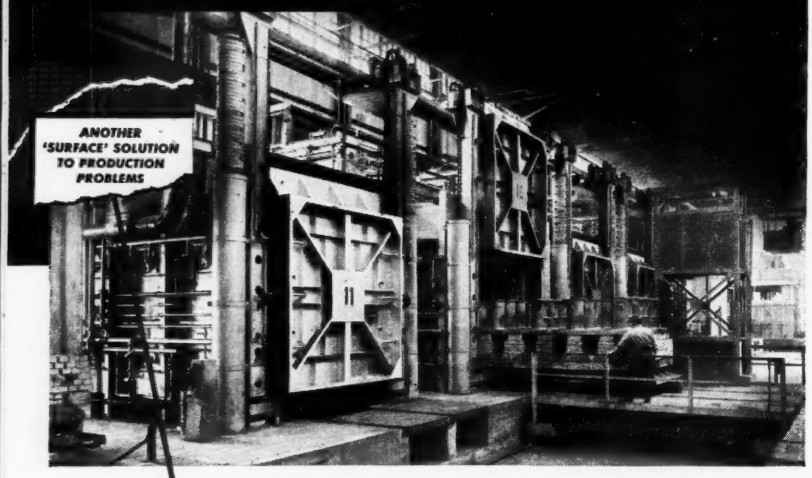
TITLE_____

COMPANY_____

CITY_____ STATE_____

American Air Filter
COMPANY, INC.
215 Central Avenue, Louisville 8, Ky.
American Air Filter of Canada, Ltd., Montreal, P. Q.
Pacific Division Office, San Francisco, California

'Surface'



NORMALIZING armor castings in a 'Surface' car bottom direct-fired furnace with low pressure, velocity type burners.

*Direct-fired Furnaces may be your answer!

For many heating and heat treating operations, where accurate control of temperature is the prime requirement, 'Surface' direct-fired furnaces often prove most economical.

Consider the flexibility of direct-fired equipment... An available temperature range of 600F to 2500F means you can draw, harden, anneal and forge... 70 types of 'Surface' burners in 700 sizes provide combustion equipment for your large and small production jobs. In addition, over 80 proved types of modern materials handling mechanisms are available for many important labor savings.

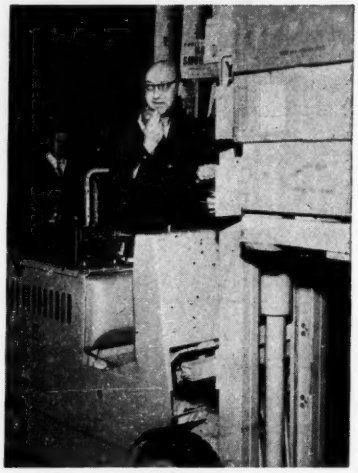
Let us give you some new ideas on what 'Surface' direct-fired furnaces can do for you. Write ←today for Bulletin SC-156.

*'SURFACE' DIRECT-FIRED FURNACES FOR:

Annealing • Cycle Annealing
Stress Relieving • Drawing
Hardening • Malleableizing
Normalizing • Pack Carburizing
Preheating • Wire Patenting
Interrupted Quenching • Forging

SURFACE COMBUSTION Corporation
TOLEDO 1, OHIO

'Surface' INDUSTRIAL FURNACES AND BURNERS
Kathabar HUMIDITY CONDITIONING SYSTEMS
Janitrol AUTOMATIC HEATING EQUIPMENT



Remote Control Handling

Two-way industrial radio introduced by General Electric Co. is designed to make materials handling operations more efficient. All operating controls are mounted on the front of the cabinet; speaker is separate and can be spotted in best location for listening. New line includes four models

loading and unloading; ability of machine to copy from either template or a prototype; and automatic feed change (ratio 2 to 1) during cutting giving a uniform surface finish and to obtain the highest metal removal rate.

Mellon Has Standards Plan

Systematic studies of standardization and its applications in science, engineering, production and marketing will be conducted under a fellowship announced by Mellon Institute, Pittsburgh. Projects will be organized and supervised by Dr. Dickson Reck, advisory fellow. Dr. Reck will work in co-operation with research specialists of the institute and with national authorities and societies.

During early years of World War II Dr. Reck headed the standards division of OPA. From 1944-1947 he was on detail from the State Department to the government of the Republic of China, where he served as an adviser on industrial organization and standardization.

Later, from 1947 to 1950, Department of Defense sent him to Japan to give attention to problems of technology and standard-

RUGGED Century MOTORS help

KEEP PRODUCTION ROLLING

Arrow shows 75 horsepower Century Slip Ring motor installed on a large bending roll.

Century Motors are designed for stamina, engineered for long, dependable service, carefully tested and balanced for precision performance.

What's more, you can select a size and type of Century Motor that's exactly right for your particular job. They're built in sizes from ⅛ to 400 h.p.— to meet all kinds of atmospheric or plant operating conditions.

Why settle for less than a Century, when you specify your next electric motor?

Century C MOTORS

CENTURY ELECTRIC COMPANY
1806 PINE STREET • ST. LOUIS 3, MISSOURI

CE-754

OFFICES AND STOCK POINTS IN PRINCIPAL CITIES

ization. More recently he acted as an adviser to the American Standards Association.

Carbide Kit Permits Job Tests

Sample kit containing a variety of shapes and sizes of its new grade 608 cemented chrome carbide is available from Carboloy Department, General Electric Co., Detroit. The kit is offered to permit tests for checking corrosion, abrasion and erosion resistance in specific applications.

The carbide is a stable nonmagnetic metal containing 83 per cent chromium carbide, 2 per cent tungsten carbide and 15 per cent nickel. It has about the same density as SAE steel and approximately the same coefficient of expansion.

Tests indicate high resistance to acids, salt spray, steam erosion and high temperature oxidation. This is combined with good abrasion resistance. Fabrication and finishing techniques are identical to those for tungsten carbide.

Typical applications proposed include use in shear blades for molten glass; centrifuge nozzles for separating equipment; bearings where corrosives are present; valve and core pins for die casting processes; and nozzles and valves for processing such items as chemicals and petroleum products.

Halts Corrosion Crime

REMOVING fingerprints usually is associated with one type of protection—to the safecracker. But a new digit-print remover developed by Gulf Oil Corp., Pittsburgh, protects metals from that well known "thief" called corrosion.

The compound, says Gulf, has wide application in the metalworking field in removing body acids and persperation from metal surfaces. It prevents corrosion which destroys both surface finish and dimensional tolerances.

Product can be used on steel, brass, copper, cadmium, magnesium and zinc. It may be applied by dipping, flooding or spraying.

Stainless Pipe Is Lighter

Dimensions for schedule 5S stainless steel pipe are now included in the newly revised edition of American Standard B36.19, stainless steel pipe, offering opportunity for greater economy in the cost and use of this critical material.

The three original schedules of pipe thickness are retained. The new schedule 5S pipe is approximately one-third lighter than schedule 10S.

American Standards Association, New York, reports that needs of the chemical industry for stainless steel pipe lighter than that covered by schedule 10S precipitated development of the new pipe.

Rivets Selected Automatically

Proper selection of the correct tubular or split rivet for an assembly is easily made with a pocket-size selector prepared by Chicago Rivet & Machine Co., Bellwood, Ill.

Selector is dialed to the proposed

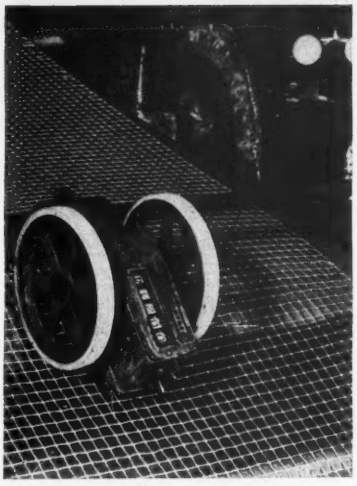
size and type rivet and reading tells clinch allowance, recommended hole diameter and head diameter.

Temperature Tester Completed

Rubber and plastic will be roasted and frozen in temperatures down to minus 80° F and up to 600° F in chambers completed recently by U. S. Rubber Co., New York. Electrically driven contrivances inside the chambers bend, stretch and otherwise punish products for many hours in the extreme heat and cold.

Parts passing the tests are designed to weather climatic conditions met in either polar or desert areas. Equally important, they should also withstand temperature extremes generated by aircraft motors and exhaust.

Cold chamber is refrigerated by dry ice immersed in alcohol, which is circulated through a radiator. The unit is insulated heavily and temperature controlled thermostatically. Circulating air type oven is heated electrically. Regulating and measuring devices control air temperature, pressure and flow.



Foil for Abrasion

When rubber rims failed to last more than three weeks on this Durant counter, a major woven wire producer substituted nylon. Report shows abrasive action of the screen caused no wear after seven months service. Rims are made from tubing supplied by Polymer Corp. of Pennsylvania, Reading, Pa. Counter measures screen in 10-foot rolls as it is packaged for shipment

Warning Sounded on Sodium

Properties of sodium and information on its safe handling and use are given in data sheet SD-47 published by the Manufacturing Chemists' Association Inc., Washington.

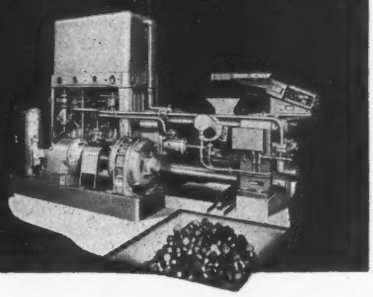
Both in its solid and molten forms sodium presents a number of potential hazards which should be understood by workers.

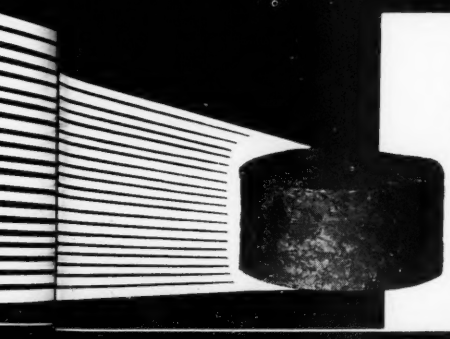
Aluminum Solder Fills Faster

Auto body shops may find it a little easier to obliterate dents through use of aluminum as the principal ingredient in a new filling solder. Manufacturer, Swiss Laboratory, Cleveland, says its product takes 50 per cent less heat than tin alloy solder and fills without fluxing or shrinking.

Among important attributes pointed out by the firm are fast buildup and absence of run or drip when worked on an upright surface. The company says no new tools or skills are required for

with a MILWAUKEE BRIQUETTING PRESS



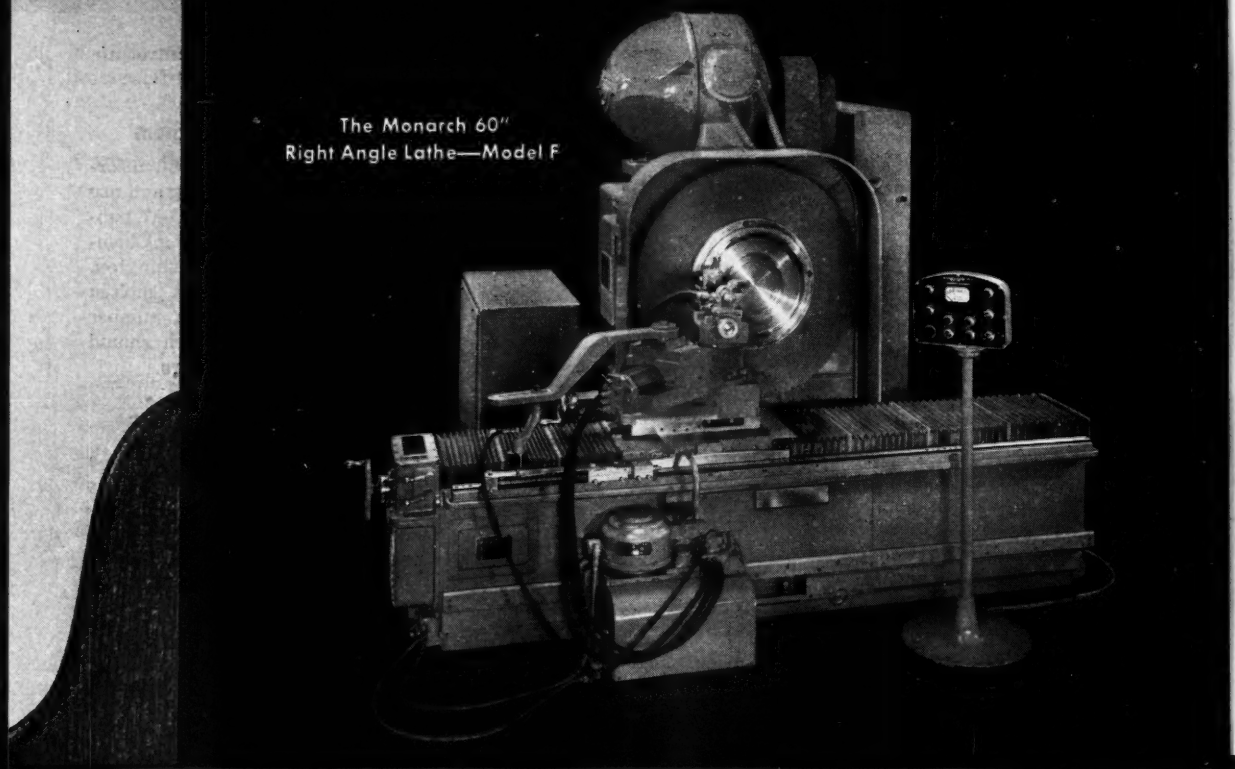


Convert low-grade bulk borings, turnings, chips and shavings into compact high-grade briquettes with the **press that pays for itself!** The MILWAUKEE Briquetting Press effects substantial savings by conserving vital metals, providing close scrap control, and reducing scrap handling and storage costs.

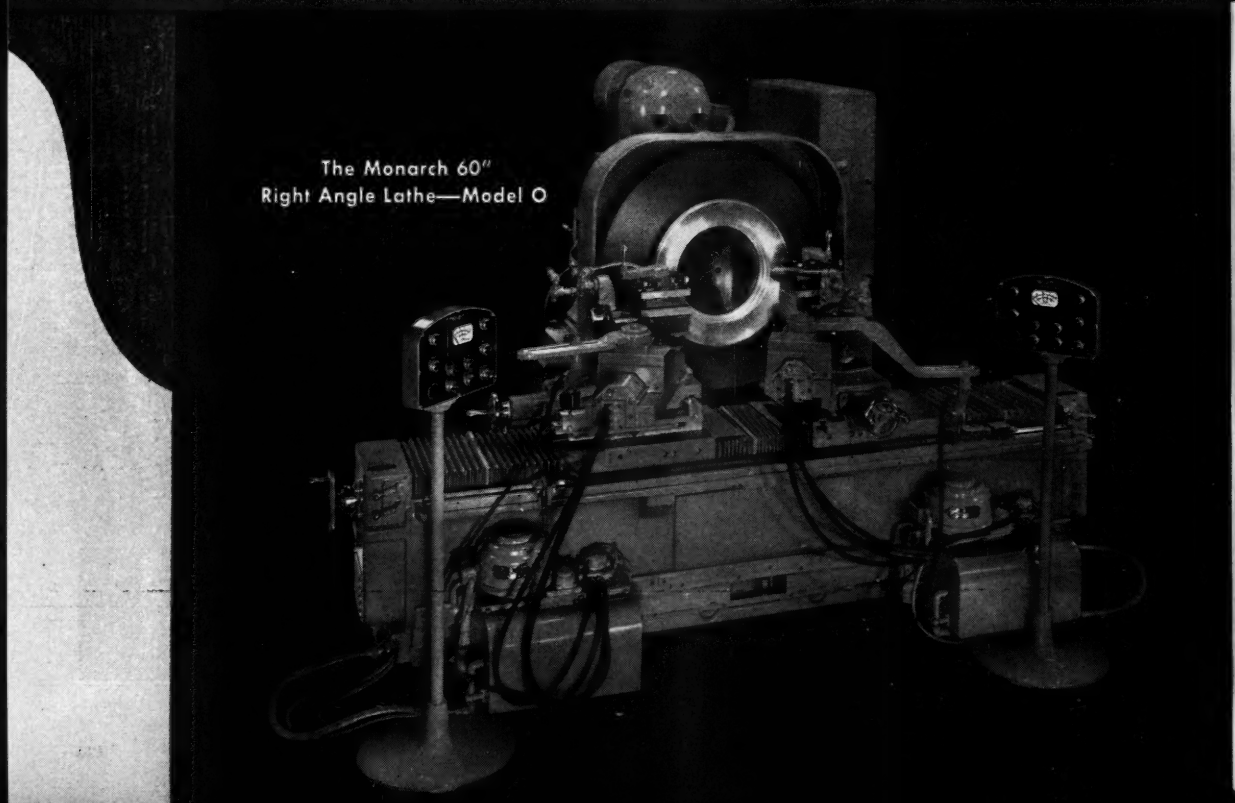
Automatic in operation, the MILWAUKEE Press handles steel, aluminum, cast iron, bronze, magnesium, brass and other metals at rates up to 3½ tons per hour. Briquettes produced can be charged directly into furnace or foundry cupolas. In most plants, savings pay for press in less than one year. Write today for 8-page illustrated Bulletin No. 117 for complete data on six models available.

Foundry Equipment Division

6495 GRAND DIVISION AVENUE • CLEVELAND 25, OHIO



The Monarch 60"
Right Angle Lathe—Model F



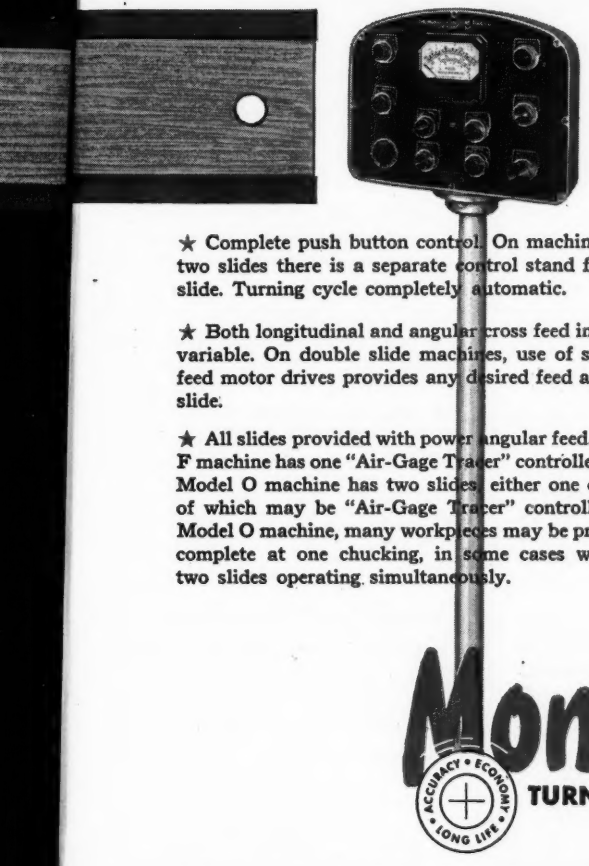
The Monarch 60"
Right Angle Lathe—Model O

2 Monarch 60″ Right Angle Lathes To Machine Jet Engine Parts To a "T"

BOTH with "Air-Gage Tracer" Control

Model F — Constant surface cutting speed — principally for facing.
Model O — Dual slides — principally for turning and boring.

These new Monarch lathes were developed to meet fully the exacting requirements of the jet aircraft industry. Model F is recommended particularly for finish facing of jet engine discs, wheels and other work of similar shape; Model O for finish turning and boring jet engine rings, vanes, shrouds and the like. All three classes of operations may be performed on either model. These machines are ideal for any type of thin-walled workpiece having large diameter and short length. Note these Monarch features:



★ Complete push button control. On machines with two slides there is a separate control stand for each slide. Turning cycle completely automatic.

★ Both longitudinal and angular cross feed infinitely variable. On double slide machines, use of separate feed motor drives provides any desired feed at either slide.

★ All slides provided with power angular feed. Model F machine has one "Air-Gage Tracer" controlled slide. Model O machine has two slides, either one or both of which may be "Air-Gage Tracer" controlled. On Model O machine, many workpieces may be produced complete at one chucking, in some cases with the two slides operating simultaneously.

★ No other tracer control method yet devised equals the Monarch "Air-Gage Tracer" in speed of accurate output. As all "Air-Gage Tracer" slides are of the swiveling type and are mounted on a power angular feed slide, there is practically no limitation to the direction of tool approach to the work. This versatility is necessary for the economical machining of many complex jet aircraft parts.

★ Headstock position adjustable over a total travel of 12″. This exclusive Monarch feature brings the work closer to the operator, thereby making loading and unloading easier. It also keeps tool overhang to a minimum.

★ Constant surface cutting speed feature for facing operations on Model F machine permits maintenance of satisfactory finish over entire face regardless of extreme diameter variation. Tool life is also measurably improved. Compared with the performance of a machine not having this feature, production is increased up to as much as 75%.

★ Either a 40″ or a 52″ face plate may be supplied. Work up to 60″ in diameter may be swung in gap as long as its thickness (or combined thickness of work and holding fixture) does not exceed 14″. All machines have power longitudinal feed for up to 48″ turn diameter.

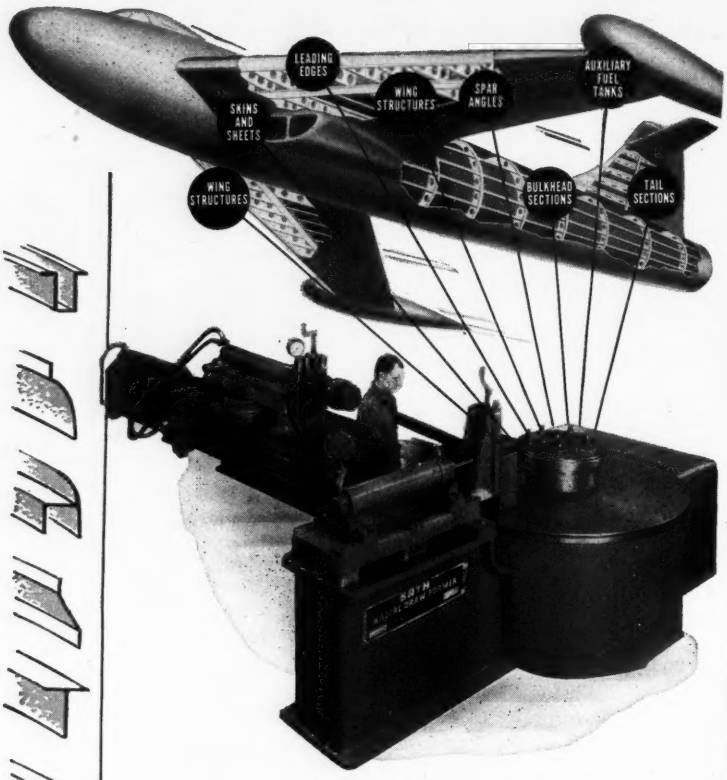
Remember, above all other things, that the heart of the Monarch Right Angle Lathe is the "Air-Gage Tracer". This versatile duplication method has been time-proved on many hundreds of Monarch lathes of various types doing a vast variety of turning, boring and facing operations. You are invited to get the complete story by writing on your business letterhead for booklet No. 1401 . . . . . *The Monarch Machine Tool Company, Sidney, Ohio.*

Monarch
ACCURACY • ECONOMY • LONG LIFE
TURNING MACHINES

FOR A GOOD TURN FASTER . . . TURN TO MONARCH

LEADING AIRCRAFT MANUFACTURERS ARE BUYING

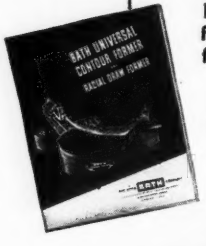
BATH RADIAL DRAW CONTOUR FORMERS



AIRCRAFT FUSELAGE AND JET ENGINE COMPONENTS IN PRODUCTION QUANTITIES ... FAST AND ACCURATE!

The versatility of the Bath Radial Draw Contour Former makes it a natural for forming aircraft fuselage, jet engine and guided missile parts. Stretch and compression formed, the parts pass rigid inspection. Cross sections of roll-formed and extruded parts as shown at left, are faithfully maintained throughout varied bends.

The performance range extends from shallow bends in formed strip stock and sharp bends in flanged extrusions to full circles and spirals in metals from 24ST aluminum to titanium of 95% purity.



Machine capacities from 12½ to 200 tons in standard Models. Write for catalog CF-352.

THE CYRIL BATH COMPANY

Manufacturers of Metal Forming Machinery

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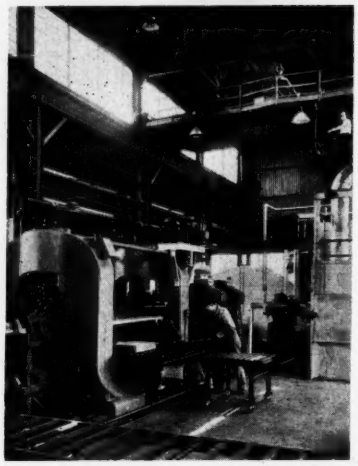


More Magnesium Facilities

Two-high hot break-down mill, shown here, is part of the rolling equipment in the new magnesium rolling mill built by Brooks & Perkins Inc. in Livonia, Mich. Complete melting, alloying, casting and rolling facilities are included. Control laboratory is equipped for a complete analysis

handling. Solder will withstand a 350° F infra-red bake, taking any finish, lacquer or synthetic. Low melting point also indicates freedom from metal warping.

Wheel Line Changes Hands

Goddeyne Mfg. Co., Bay City, Mich., reports purchase of Kayel Wheel Division, Kayel Machine & Tool Co., Detroit. Kayel's wheel line is used chiefly by the farm equipment and materials handling industries. Manufacture of the rubber-tired pressed steel wheels will be shifted to Bay City.

A subsidiary company, called Goddeyne Wheel Products, is being established to absorb manufacturing operations, with headquarters at the firm's main plant in Bay City.

Transformer Cores Ribbed

Hipersil cores made by Westinghouse Electric Corp. for use in specialty and electronic transformers are being ribbed for added strength. Slightly corrugated before being wound into cores, the grain-oriented steel strip lies on itself in a compact and tightly integrated mass.

Additional mechanical strength afforded by the ribbed design

when the HEAT is on . . .

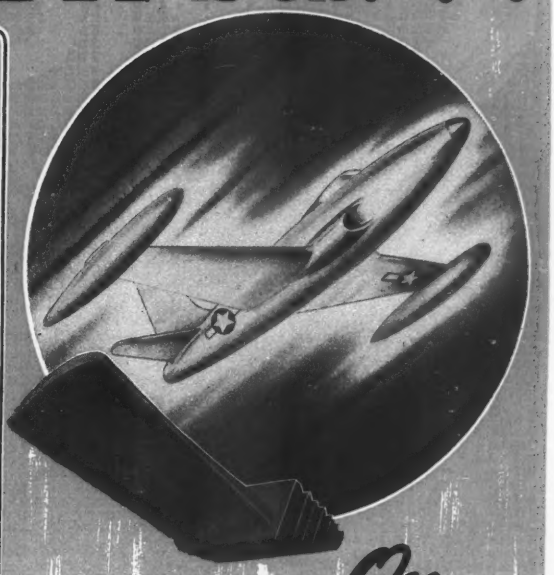
TAKE IT *Off* with KENNAMETAL

When the metal-cutting job is rugged — specifications precise — delivery schedule tight — use Kennametal tooling to "take off the heat".

Kennametal tools are remarkably hard, strong, and tough. They stay on the job longer . . . require fewer trips to the grinding room. Idle machine time is minimized . . . skilled operators work to best advantage . . . tooling costs drop—and productivity rises through higher speed and heavier feeds.

Kennametal gives this superior performance — consistently — because its physical structure is sound and uniform — a characteristic which is imparted and maintained by distinctive processes under the direction of men who know carbides from "the ground floor, on up".*

Men — with technical "know-how" — make Kennametal an outstanding tool material. And — the skilled men who operate and are in charge of metal-cutting machines fully realize its plus-value when "the heat is on".



POUR IT *On* with KENTANIUM

When there is urgent need for a material having longer service life and improved performance under high temperatures — Kentanium offers outstanding advantages.

It has much better stress rupture characteristics than conventional alloys even at 1600°F, a superiority that becomes more pronounced as temperatures increase. From 1800°F to 2200°F, for long periods, and up to 4500°F for short exposures, it withstands oxidation while retaining unusually high strength, and shows no weakening under thermal shock.

Much lighter than steels and conventional alloys, it presents design and operating advantages, particularly for rotating, or reciprocating parts.

Kentanium is suitable for: gas turbine components, valves and seats for gas engines, hot spinning tools, hot extrusion dies, and many other applications. If your design problem involves high temperature conditions, let us demonstrate how you can safely "pour on" more heat when structural elements are made of Kentanium.*

KENNAMETAL

**Kennametal Inc. mines basic raw materials, refines all its carbides directly from ores, oxides, and by-products, processes these carbides into Kennametal compositions . . . then engineers and fabricates complete tools and wear-part designs that fully utilize the distinctive properties of Kennametal.*

KENNAMETAL®
SUPERIOR CEMENTED CARBIDES
KENNAMETAL Inc. LATROBE, PA.

KENTANIUM

**Kentanium—developed and produced exclusively by Kennametal Inc.— is chiefly titanium carbide with nickel as auxiliary metal (no tungsten or cobalt). Made in several different compositions to meet varying conditions. Available as standard extruded shapes . . simple molded forms . . intricate designs.*

The ORTON Torque-Control

CRANE with GM Allison Torque Converter.

...smooth, uninterrupted flow of power, shock-free, jolt-free control.

Start heavy loads without full-throttle "slip-clutching" or shock loading on gears and shafts.

Torque multiplication always at load requirement — NO racing engine in an idle crane (because the load, not the throttle, governs).

REQUEST BULLETIN NO. 41

ORTON
CRANE & SHOVEL CO.
608 S. DEARBORN ST.
CHICAGO 5, ILLINOIS

Stainless Descaling

Continuous production averages about 1300 pounds of steel per hour in this sodium hydride salt bath installed by Surface Combustion Corp., Toledo. A midwestern manufacturer uses a 2 per cent sodium hydride concentration generated in molten sodium hydroxide to descale stainless steel parts. Gas-fired burners hold bath at 700°F

maintains more perfect C sections both when the core is cut apart for assembling with the windings and during transformer operation. This means that etched surfaces maintain good contact, resulting in a low-reluctance magnetic path and a low-loss butt joint. Same sizes and tolerances are retained.

Descaling Without Abrasives

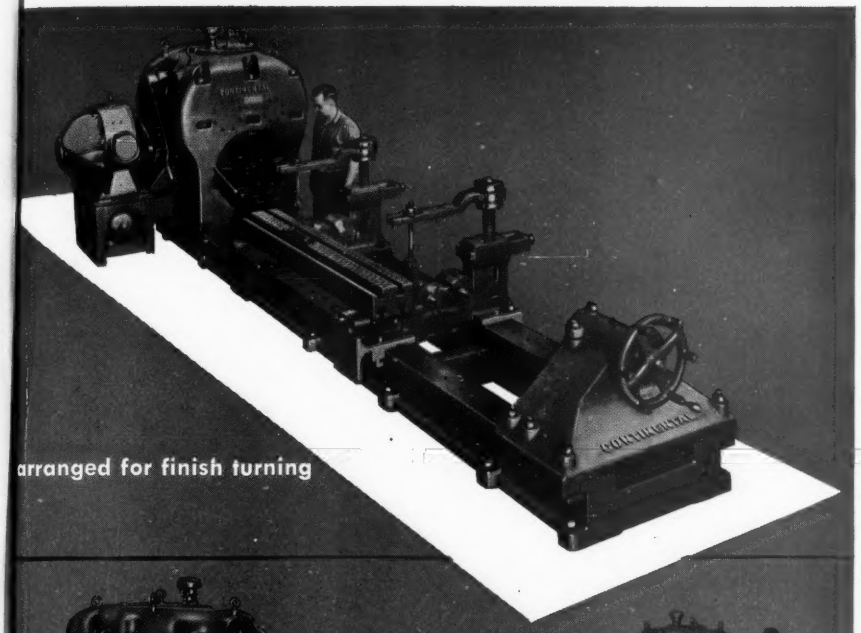
Tests conducted by Magnus Chemical Co., Garwood, N. J., resulted in more efficient 20mm shell ring descaling by a large parts producer, permitting the latter to reduce costs of this operation substantially.

Work by the chemical firm indicated that use of its D-Scale-RS in a tumbling barrel would bring satisfactory results without adding stones or other abrasives. When operations were moved to the plant level, rings were run with a hot water solution including the descaler, but without stones. Result, says the company, was satisfactory descaling and a bright copper color in about 15 minutes.

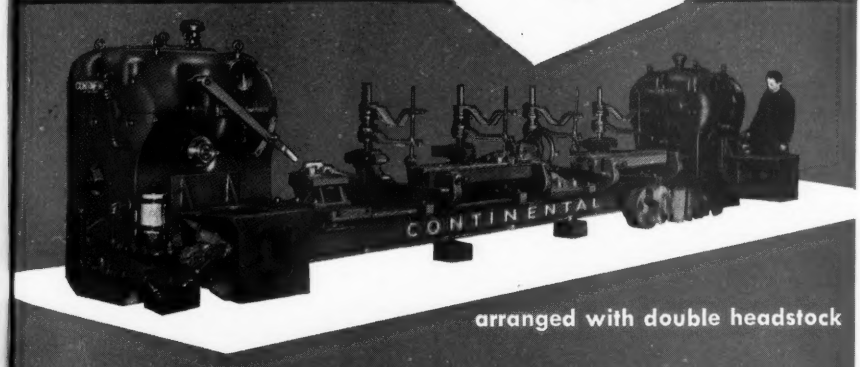
Shell rings are descaled in batches of 150 pounds in a solution employing 8 ounces of descaler per gallon.

Continental

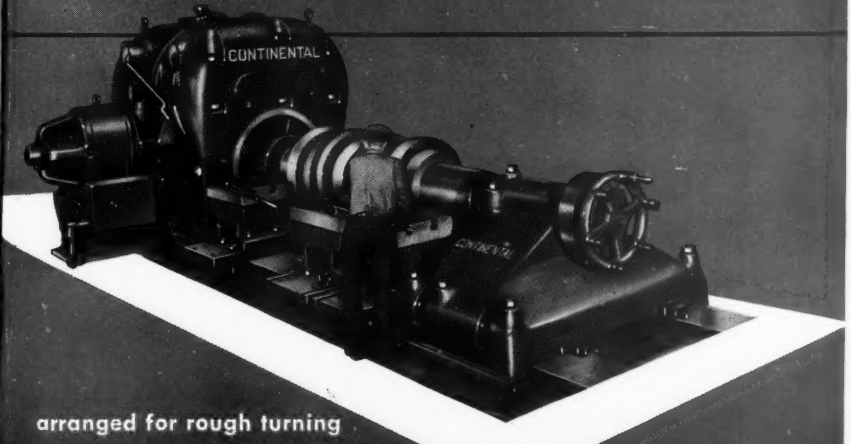
HEAVY-DUTY ROLL LATHES



arranged for finish turning



arranged with double headstock



arranged for rough turning

Rolling Mill installations engineered complete

for steel, alloy and non-ferrous metals

BLOOMING MILLS
STRUCTURAL MILLS
RAIL MILLS
BILLET MILLS
ROD MILLS
BAR MILLS
MERCHANT MILLS

★ ★ ★

SLABBING MILLS
UNIVERSAL MILLS
PLATE MILLS
HOT STRIP MILLS
COLD STRIP MILLS
TEMPER MILLS

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Mills complete with Auxiliary Equipment

★ ★ ★

ROLL LATHES

★ ★ ★

SPECIAL MACHINERY

★ ★ ★

CASTINGS—carbon and alloy steel from 20 to 250,000 pounds

ROLLS—iron, alloy iron and steel rolls for all types of rolling mills

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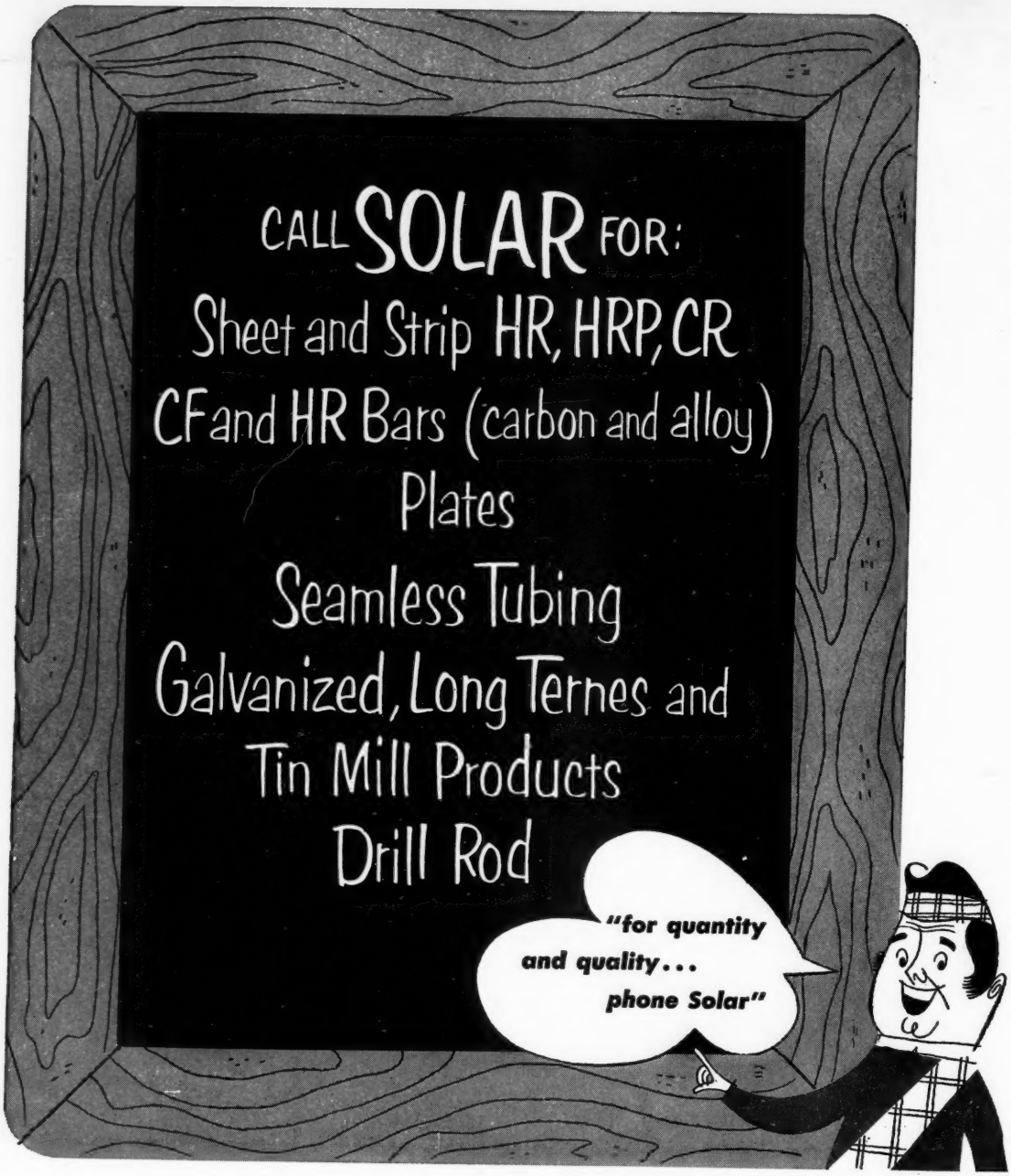
Plants at:
East Chicago, Ind.
Wheeling, W. Va.
Pittsburgh, Pa.

CONTINENTAL
Foundry & Machine
Company



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SOLAR STEEL CORPORATION

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CALENDAR OF MEETINGS

July 18-19, Truck-Trailer Manufacturers Association: Annual summer meeting, Edgewater Beach Hotel, Chicago. Association address: 1024 National Press Bldg., Washington 4. Managing director: John B. Hulse.

July 25, Malleable Founders Society: Western sectional meeting, Hotel Drake, Chicago. Society address: 1800 Union Commerce Bldg., Cleveland. Secretary: Lowell D. Ryan.

August 11-13, Society of Automotive Engineers: National West Coast meeting, Fairmont Hotel, San Francisco. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

August 19-22, American Institute of Electrical Engineers: Pacific general meeting, Phoenix, Ariz. Institute address: 33 W. 39th St., New York 18. Secretary: H. H. Henline.

September 3-13, Centennial of Engineering, Convocation Period: General manager, F. W. Edwards. Address: 57th St. & S. Shore Drive, Chicago 37.

September 4-6, American Institute of Chemical Engineers: Palmer House, Chicago. Institute address: 120 E. 41st St., New York 17. Secretary: Stephen L. Tyler.

September 8-10, American Standards Association: National standardization conference, Museum of Science & Industry, Chicago. Association address: 70 E. 45th St., New York 17. Secretary: G. F. Hussey Jr.

September 8-12, Instrument Society of America: Annual fall meeting and exhibit, Public Auditorium & Hotel Cleveland, Cleveland. Society address: 921 Ridge Ave., Pittsburgh 12. Secretary: Richard Rimbach.

September 9-11, Society of Automotive Engineers: National tractor meeting, Hotel Schroeder, Milwaukee. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

September 9-13, American Chemical Society, Chicago Section: National chemical exposition, Chicago Coliseum, Chicago. Address: 86 E. Randolph St., Chicago 1.

September 11, American Iron & Steel Institute: Regional technical meeting, Palmer House, Chicago. Institute address: 350 Fifth Ave., New York 1. Meeting director: Frank Ragland.

September 14-17, National Automatic Merchandising Association: Annual meeting and exhibit, Palmer House, Chicago. Association address: 7 S. Dearborn St., Chicago. Secretary: C. S. Darling.

September 14-18, Pressed Metal Institute: Annual fall meeting, Pocono Manor, Pa. Institute address: 2860 E. 130th St., Cleveland 20. Manager: Orrin B. Werntz.

September 14-19, American Chemical Society: Fall meeting, Atlantic City, N. J. Society address: 1155 16th St. NW, Washington. Executive secretary: Alden H. Emery.

September 14-20, Concrete Reinforcing Steel Institute: Semi-annual fall meeting, The Broadmoor, Colorado Springs, Colo. Institute address: 38 S. Dearborn St., Chicago 3. Secretary: H. C. Delzell.

September 22-23, Steel Founders' Society of America: Fall meeting, The Homestead, Hot Springs, Va. Society address: 920 Midland Bldg., Cleveland 15. Secretary: F. Kermit Donaldson.

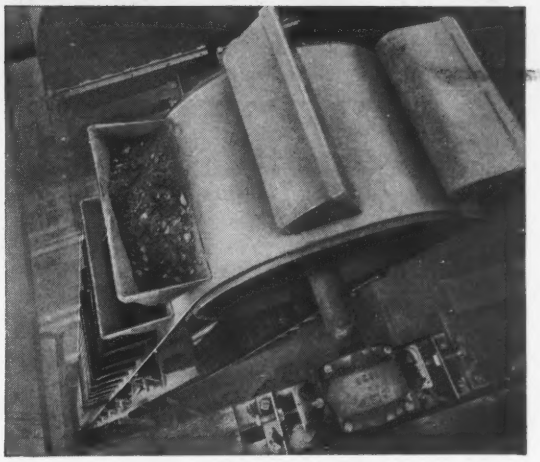
September 23-24, National Truck Body Manufacturers Association: Annual meeting, Muehlebach Hotel, Kansas City, Mo. Association address: DuPont Circle Bldg., Washington. Secretary: Shipley D. Burton.

September 22-25, American Mining Congress: Metal & nonmetallic mineral mining conference, Denver. Congress address: 1102 Ring Bldg., Washington 6. Secretary: Julian Conover.

September 29-October 2, American Institute of Steel Construction Inc.: Annual convention, Empress Hotel, Victoria, B. C. Institute address: 101 Park Ave., New York 17. Executive vice president: L. Abbett Post.

September 30-October 3, Association of Iron & Steel Engineers: Fall meeting and exhibit, Hotel Statler and Public Auditorium, Cleveland. Association address: 1010 Empire Bldg., Pittsburgh 22. Director: T. V. Ess.

HEWITT-ROBINS



SAVINGS ARE UP... MAINTENANCE DOWN

With Hewitt-Robins Belt & Bucket Elevators

Whatever your specific requirements, a Hewitt-Robins Belt & Bucket Elevator offers you a lower-cost, more dependable method of handling your bulk materials . . . there are 58 standard types, styles and sizes to choose from.

Hewitt-Robins Belt & Bucket Elevators are equipped with load-matched belting that is specially designed to ward off the punishing pull of bucket bolts—resist slippage wear—ban mildew. This better belting is available in three types, with or without covers.

For lifting heavy tonnages of moderately abrasive material, under wet or dry conditions . . . *specify Hewitt-Robins Ajax® Belting.*

For general bucket operation, lifting light, moderately abrasive materials where economy rules, *specify Hewitt-Robins Conservo® Belting.*

For meeting unusually severe requirements such as handling heavy, abrasive or wet, gritty materials, *specify Hewitt-Robins Monarch® Belting.*

Get complete facts and figures on how you can save with a Hewitt-Robins Belt & Bucket Elevator . . . write for Bulletin No. 151.

HEWITT-ROBINS HR INCORPORATED
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Hewitt Rubber Division
Hewitt Restfoam® Division
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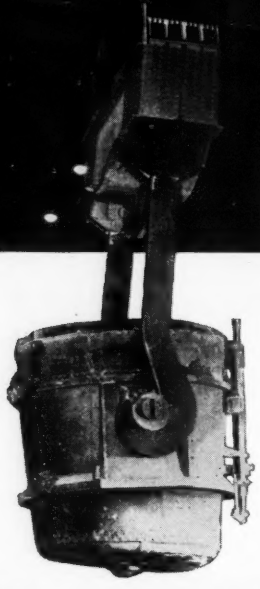
Vibrationless LIFTING POWER



300/60/20-TON, 4-GIRDER DOUBLE TROLLEY *Alliance* LADLE CRANE

● Building big cranes has been our business here at Alliance for more than 50 years. Whenever the industrial world has required cranes of large capacity, it has always found The Alliance Machine Company with designs and "know-how" to meet its requirements.

The 4-girder, double trolley ladle crane illustrated here was built for the Homestead Steel Works of the United States Steel Company to handle the increased Open Hearth capacity. It required a 4-story cage to house the electrical equipment to control the various motions of this crane. The three upper stories contain the magnetic control equipment and resistors. The bottom section of the cage houses the master controllers and the operator and is insulated.

This ladle crane is equipped with a two-motor, synchronized worm drive, interlocked double drum type main hoist. The synchronizing shaft employed in this scheme of gearing not only eliminates the undesirable ratchet gears but makes possible an additional safety feature in case one of the hoist motors fail. Under this condition both worms are driven by the remaining motor and all gearing functions as with two motors. In case of failure of one hoist motor on the conventional drive without the synchronizing shaft, hoisting is accomplished by only one set of gears. This imposes a double load on active gearing, the second drum being driven through the interlocking drum gears. The hoist gearing is so proportioned that the full capacity of the crane can be lifted by one motor without exceeding the quarter-hour rating.

The drum gears and pinions of the main hoist of this new crane have precision-cut, single-helical teeth, and in cooperation with the worm drive, assure vibrationless operation on either high or low speed hoisting and lowering.

All gears are fully enclosed and operate in a bath of oil, assuring long life and low maintenance.

The 4-part safety rope system installed on this crane affords the highest degree of safety in rope reeving.

Why not consult The Alliance Machine Company engineers when you have heavy material handling problems?

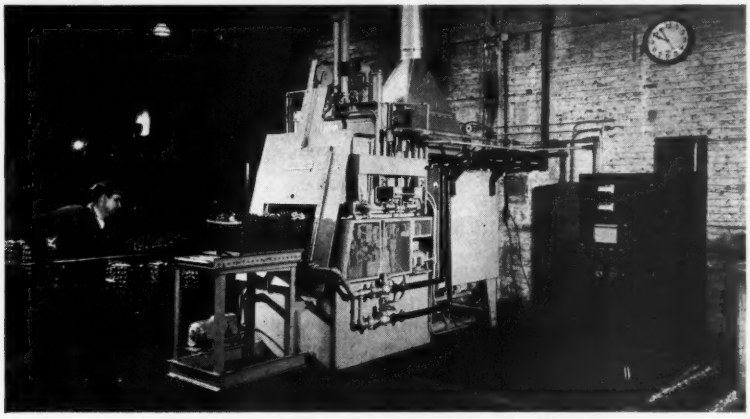
THE ALLIANCE MACHINE COMPANY

MAIN OFFICE
ALLIANCE, OHIO

PITTSBURGH OFFICE
1622 OLIVER BUILDING, PITTSBURGH, PA.

LADLE CRANES • GANTRY CRANES • FORGING MANIPULATORS • SOAKING PIT CRANES • STRIPPER CRANES • SLAB AND BILLET CHARGING MACHINES • OPEN HEARTH CHARGING MACHINES • SPECIAL MILL MACHINERY • STRUCTURAL FABRICATION

New Products and Equipment



SERIES EXPANDED BY GAS FIRED VERTICAL RADIANT TUBE UNIT
. . . rates 250 net pounds per hour for hardening or flash case dry cyaniding

LINE INCLUDES FOUR MODELS
. . . takes gears from 1 to 10 inches diameter

Carbonitriding Furnace Line

USE REPLY CARD—CIRCLE No. 1

Gas fired vertical radiant tube unit is an addition to the line of carbonitriding furnaces made by Lindberg Engineering Co., 2450 W. Hubbard St., Chicago 12, Ill. Lightweight radiant tubes can be removed and replaced in only a few minutes. This maintenance feature is designed to eliminate costly down time while the furnace cools.

Furnace is rated at 250 net pounds per hour for hardening or flash case dry cyaniding. It is a completely packaged unit, with built-in quench system and automatic cycle control. The company's Hyen endothermic atmosphere generator is adjustable to produce different atmospheres. In addition to carbonitriding, these extend to carburizing, annealing and bright hardening.

Conveyor Handles Light Parts

USE REPLY CARD—CIRCLE No. 2

Light stampings, screw machine products and similar materials can be handled on a cleated belt conveyor made by Rapids-Standard Co. Inc., Grand Rapids, Mich. Called Press-Veyor Jr., the portable power unit is available in 4, 6 and 8-foot lengths. Belt widths are 4, 8, and 12 inches.

Rigid 12-gage steel bed and guard rails are formed in one piece to prevent parts handled from catching and being damaged. Belts available include woven waterproofed cotton or neoprene with steel cleats spaced on 24-inch centers. Standard speed is 55 fpm; variations are available on order.

Die Filer Improved

USE REPLY CARD—CIRCLE No. 3

Installation of stop pins for indexing the table in level position is among improvements in design made on its Milwaukee die filer by Rice Pump & Machinery Co., N. Milwaukee St., Grafton, Wis. Included also in the redesign announced by the company are tightened tolerances for improved accuracy, and a chucking and slide arrangement of the deep throated overarm constructed to permit improved application to filing, sawing and lapping operations.

Model includes a table that tilts 15 degrees four ways, and a ball-jointed chuck for easy and quick file alignment. Scotch yoke-stroke mechanism permits true up-and-down filing motion.

REPLY CARDS

on page 149 will bring you more information on any new products and equipment in this section.

Gear Shapers Redesigned

USE REPLY CARD—CIRCLE No. 4

Improved series 1800 Shear-Speed gear shapers are announced by Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich. Twelve design features are incorporated to achieve improved performance, reduce tool change time and facilitate maintenance. The series now includes four models with gear capacities from 1 to 10 inches diameter; maximum face widths from 2¾ to 4½ inches. Model 18105 with 5-inch cutter head stroke replaces the former 18103, which had a 3-inch maximum stroke.

Design improvements in the line include a standard adjustment ring for controlling tooth spacing. This ring has two indicators to facilitate tool setting. An air cylinder in the cutter head has a clamping flange and pilot diameter that clamps work in the fixture and pilots moving parts into the base to insure positive alignment. Coolant and lubricating pumps are mounted outside the machine base.

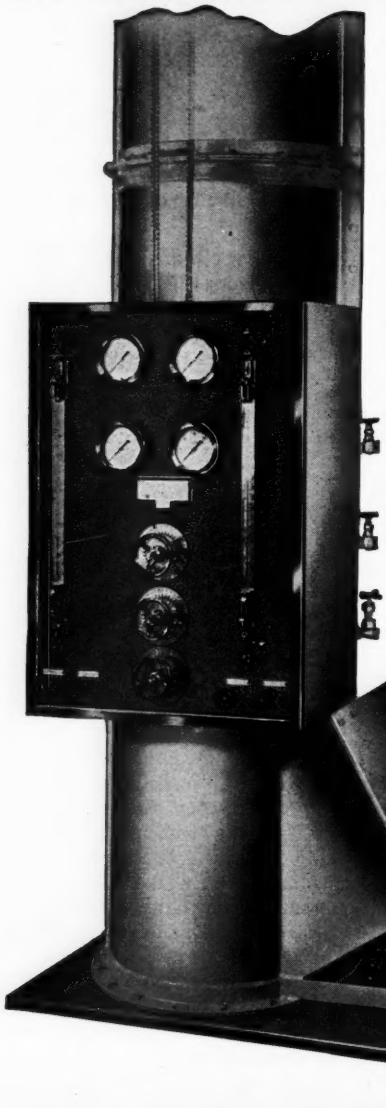
Power Drive Wheel Articulation

USE REPLY CARD—CIRCLE No. 5

Application of power drive articulation of 1⅝-inch in a line of Go-Getter lift trucks is announced by Revolvator Co., N. Bergen, N. J. Articulation of dual drive wheels produces traction under such adverse operating conditions as un-

SUPAIRCO Oxygen FROM AIR

at Lowest Costs to You



20 years of experience and the latest technological developments, have enabled us to produce a new type of SUPAIRCO OXYGEN PLANT that is marked by its endurance, simplicity of operation and low maintenance. We offer a size to meet every requirement, and if you are a user of large quantities of OXYGEN or NITROGEN GASES OR LIQUIDS, we can assure you that a SUPAIRCO OXYGEN PLANT will cut your oxygen bills practically in half.

SUPAIRCO DOUBLE RECTIFICATION COLUMN WITH LIQUID OXYGEN PUMP constitutes the main apparatus of the oxygen plant. Only additional equipment is the air compressors, air washers and driers.

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even or worn floors. It eases movement over door saddles or up and down ramps.

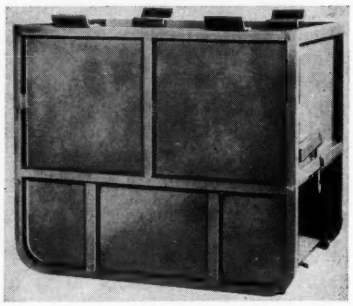
All controls in the truck line are within operator's reach. Automatic braking is deadman type and operates with handle in any position. In addition to the mechanical brake, a dynamic brake controls heavy loads on steep ramps, holding down-hill speed to about 2 mph.

Drop-Bottom Container Line

USE REPLY CARD—CIRCLE No. 6

Addition to its line of drop-bottom containers is announced by Roura Iron Works Inc., 1401 Woodland Ave., Detroit 11, Mich. Containers operate with positive counterweight handle that opens easily. Drop-bottom permits gravity flow to bring parts directly to operator's work point.

Sides are solid from top to bottom, without corrugations to catch



. . . employs positive counterweight handle

parts and prevent the bottom from dropping. Containers are built for stacking to save floor space and can be used for storage purposes. Stacking strips welded at four points on top are designed to provide loops for overhead lifting equipment.

Turbine Vane Pump Line

USE REPLY CARD—CIRCLE No. 7

Hot or cold, clear or vaporous liquids can be pumped in moderate capacity against medium or high heads by a line of turbine vane pumps introduced by Peerless Pump Division, Food Machinery & Chemical Corp., 301 W. Ave. 26, Los Angeles 31, Calif. Line of pumps close-coupled to face mount electric motors is called type TVE. Flexible-coupled electric drive

a MATERIAL to suit your requirements

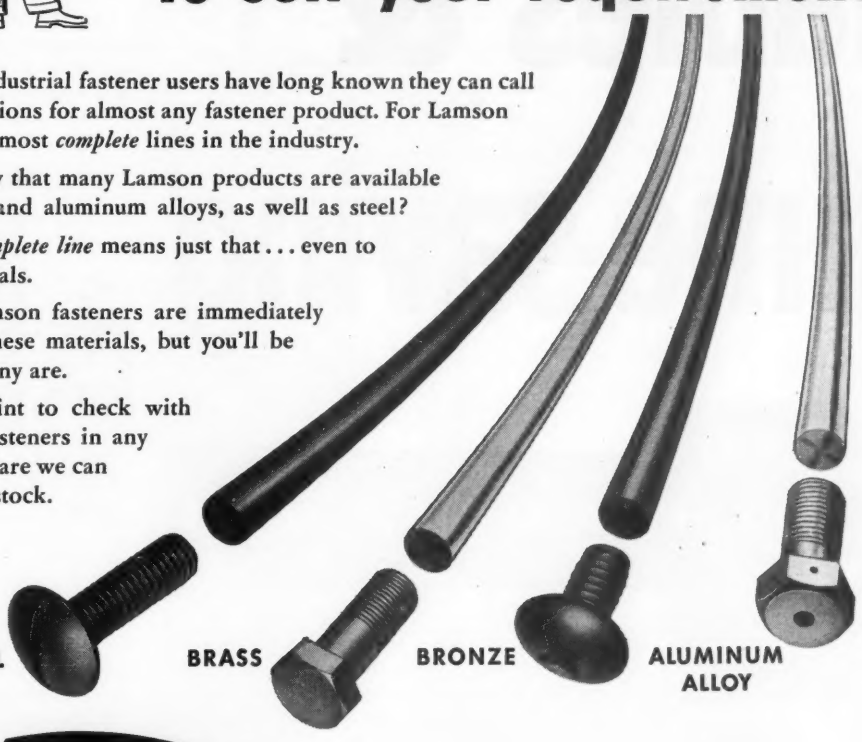
Industrial fastener users have long known they can call on Lamson & Sessions for almost any fastener product. For Lamson makes one of the most *complete* lines in the industry.

But did you know that many Lamson products are available in brass, bronze and aluminum alloys, as well as steel?

Yes, Lamson's *complete line* means just that... even to a choice of materials.

True, not *all* Lamson fasteners are immediately available in *all* these materials, but you'll be surprised how many are.

So make it a point to check with Lamson for *all* fasteners in any material. Chances are we can service you from stock.



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Precision made for fast economical assembly.

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Pre-assembled lockwashers on tapping and machine screws.

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Choice of round, pan, truss, flat oval, hexagon and Phillips heads.

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"1035" Hi-Tensile Heat-treated steel.

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Semi-finished, hot pressed, cold punched.

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Economical, vibration proof. Can be used repeatedly.

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"1035" SET SCREWS
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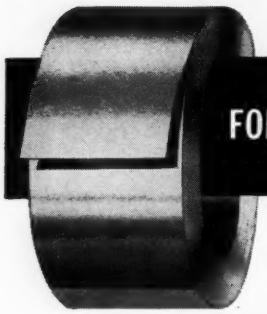
typewriters tables & time-saving



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MILLS—FOLLANSBEE, W. VA. **FOLLANSBEE METAL WAREHOUSES**—PITTSBURGH, PA., ROCHESTER, N. Y., AND FAIRFIELD, CONN.

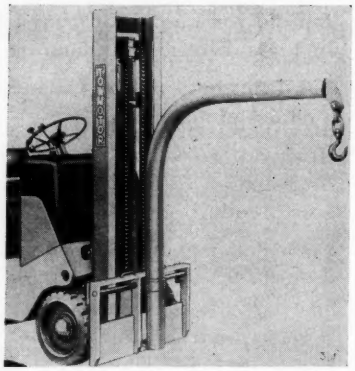
1475

pump line is designated type TVB. Pumps in both lines are available with or without the self-priming device. Applied to boiler feed service or condensate return, pumps can handle hot water up to 250° F. An additional feature is ability to handle liquids where a constant capacity is necessary, but where head conditions vary. In all cases, liquid must be clear without solids in suspension.

Crane Arm Attachment

USE REPLY CARD—CIRCLE No. 8

Greater efficiency in handling cumbersome loads should be realized with a crane arm, developed as a standard lift truck accessory by Towmotor Corp., 1226 E. 152nd



. . . expedites handling of bulky materials

St., Cleveland 10, O. Readily interchangeable with standard forks, the arm expedites plant-wide movement of heavy engines, long bars or similar bulky materials.

Entire arm is raised or lowered with the lifting carriage, actuated by standard lift mechanism. Arm is formed of extra-strength steel pipe; drop-forged standard hoist hook is furnished with a swivel suspension.

Stabilizer Balances Moisture

USE REPLY CARD—CIRCLE No. 9

Electrode stabilizer designed to keep moisture content of electrode shielding in proper balance is offered by Fred C. Archer Inc., 606 W. Wisconsin Ave., Milwaukee 3, Wis. Electrodes should be loaded in the unit at least eight hours prior to use and immediately after being removed from moisture-proof packages. Temperature is controlled by a variable thermostat,

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ROLLER CARRIER UPRIGHTS
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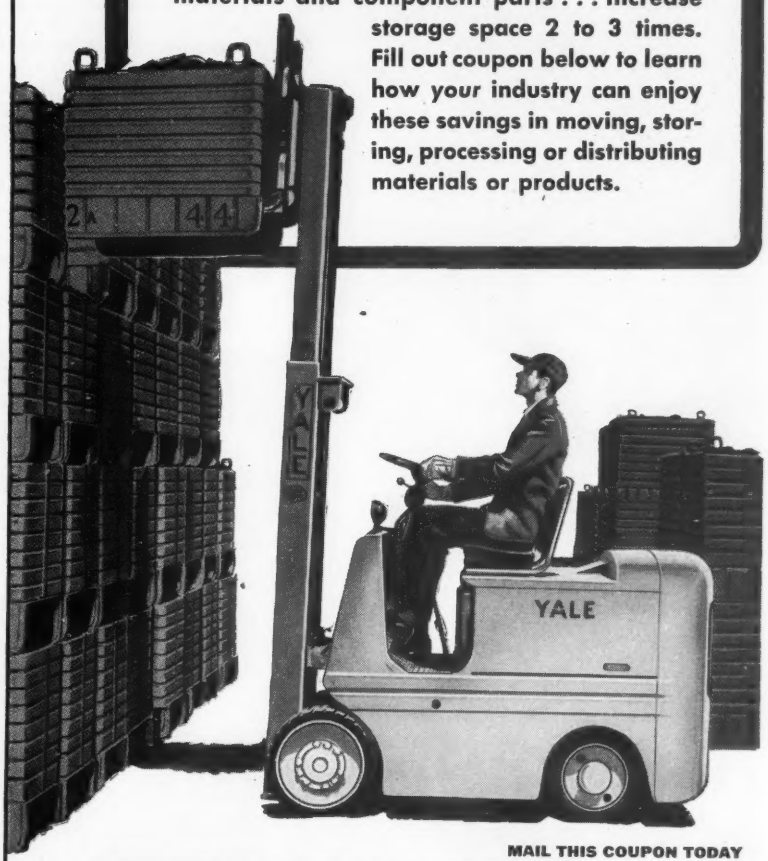

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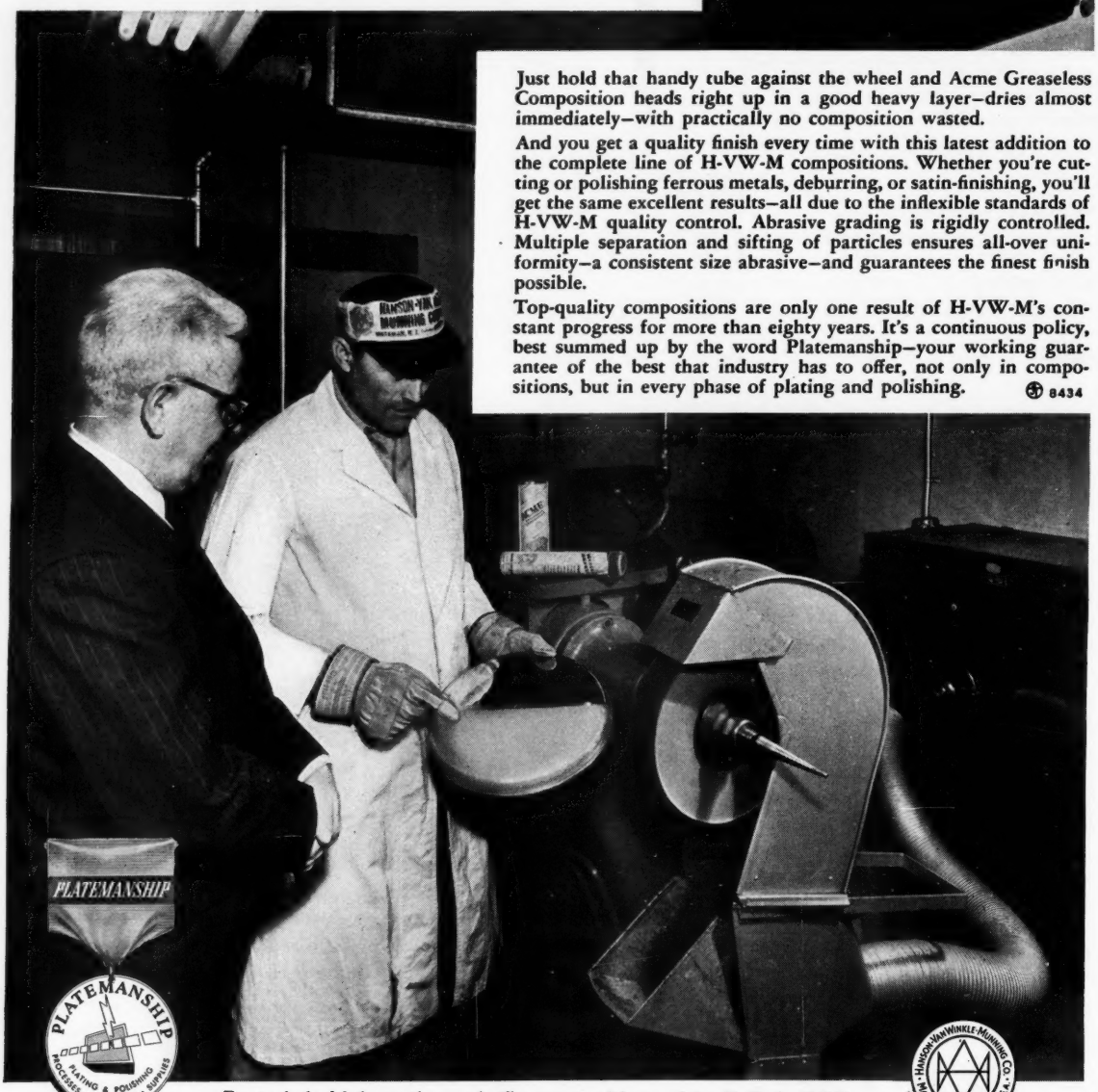

Just hold that handy tube against the wheel and Acme Greaseless Composition heads right up in a good heavy layer—dries almost immediately—with practically no composition wasted.

And you get a quality finish every time with this latest addition to the complete line of H-VW-M compositions. Whether you're cutting or polishing ferrous metals, deburring, or satin-finishing, you'll get the same excellent results—all due to the inflexible standards of H-VW-M quality control. Abrasive grading is rigidly controlled. Multiple separation and sifting of particles ensures all-over uniformity—a consistent size abrasive—and guarantees the finest finish possible.

Top-quality compositions are only one result of H-VW-M's constant progress for more than eighty years. It's a continuous policy, best summed up by the word Platemanship—your working guarantee of the best that industry has to offer, not only in compositions, but in every phase of plating and polishing. 8434

For technical information on buffing compositions ask for Bulletin C-100.

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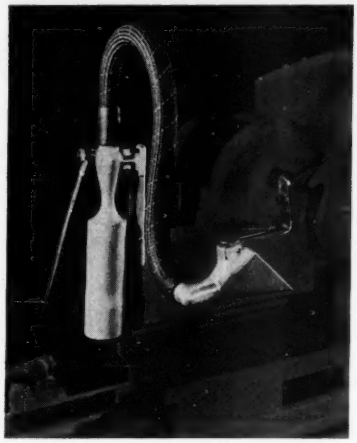
preset at a recommended 350° F. Austenitic and ferritic low-hydrogen electrodes can be stored indefinitely to preserve original quality. Units wired for 110 and 220-v are available.

Collectors Clean Grinding Dust

USE REPLY CARD—CIRCLE No. 10

Individual Vulcanaire dust collecting units for use on surface grinders and other grinding machines where dust must be removed are offered by Vulcan Tool Co., 730 Lorain Ave., Dayton 10, O. Designed for compactness and built without moving parts, the units



. . . design is compact, without moving parts

are operated from the regular plant air supply. Collectors can be cleaned quickly, require no refills. Dust cup is mounted on the grinding wheel guard or close to the wheel on other applications to assure positive location. This permits constant contact with dust as the wheel moves up or down.

Smaller size, the 200 series, has 24 cu in. capacity for grinding wheels 2 inches diameter or under. Larger size, the 700 series, has 56 cu in. capacity for grinding wheels 7 inches diameter or under.

Deep Hole Drilling Unit

USE REPLY CARD—CIRCLE No. 11

Automatic deep hole drilling unit, employing step-by-step feeding principle, is introduced by General Pacific and General Detroit Corps., 1501 E. Washington Blvd., Los Angeles, Calif., or 2200 E. Jefferson, Detroit. Mounted above the spindle to avoid crowding

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HERE'S WHY . . . Shenango centrifugally cast parts offer many inherent advantages that can help you avoid trouble and save time and money.

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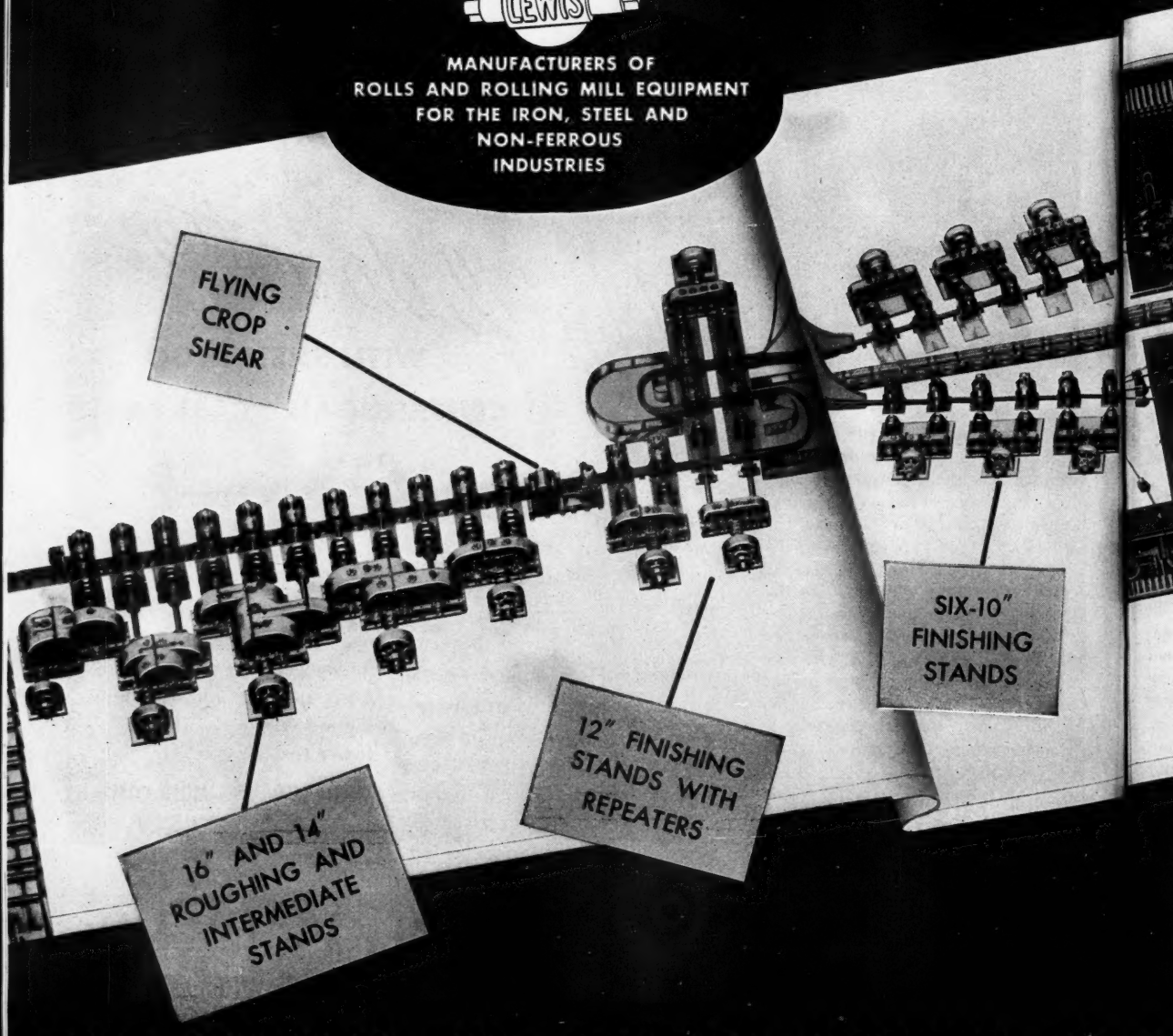
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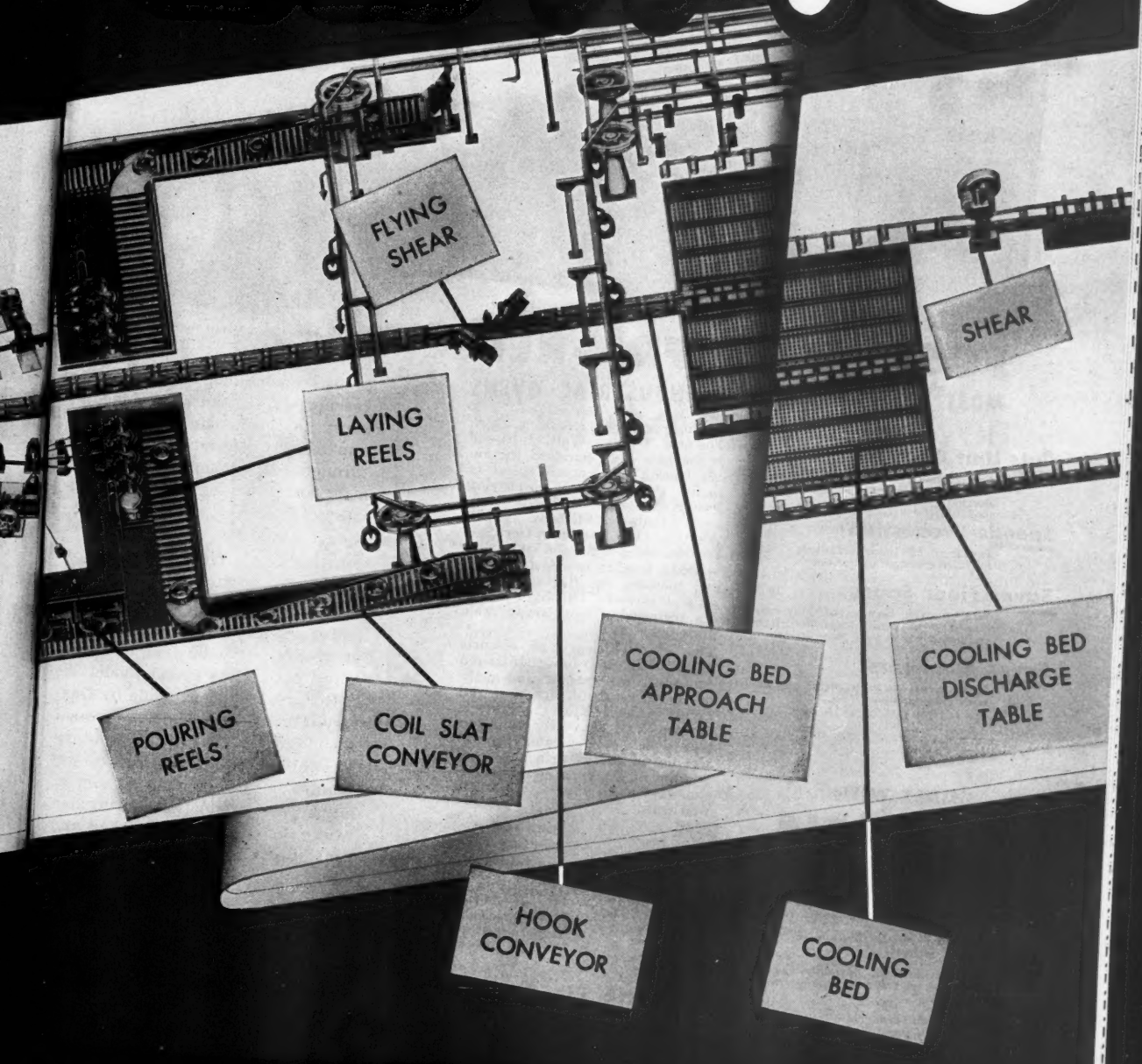

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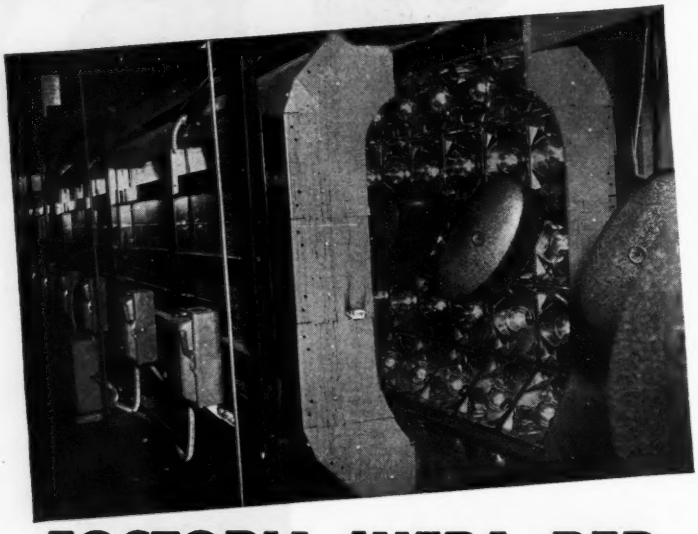

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Cuts Unit Costs
Substantially reduces all operating cost factors. Lowest "per piece" production expense.

Speeds Production
Fastest of all baking methods. Ideal for conveyorized operations.

Saves Floor Space
Smaller oven because of high efficiency. Also easily suspended from ceiling to save entire floor space.

Saves Manhours
Easily turns out more pieces per day with fewer people.

In industry from coast to coast, Fostoria "Golden Wall" Infra-red is the new high standard for finish baking efficiency. Typical of many thousands of cost-saving Fostoria installations is the oven, pictured above, used by Tropic-Aire Co. (Div. McGraw Electric), for baking white and color wrinkle finishes on electric heaters, roasters, etc. *Baking time is only 10 minutes.* This oven is ceiling mounted, saving considerable floor space.

The high efficiency of Fostoria ovens over any other Infra-red equipment or other heating methods is the result of such vital and exclusive features as the Fostoria Golden Wall with Evenray reflectors which give greater productive use of energy than any other equipment. Modern equipment is the way to cut your unit production costs.

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Golden Wall INFRA-RED

- Highest productive utilization of energy — lowest energy loss.
- Uniform heat distribution to all product surfaces.
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- Lowest unit production cost and finest, most durable finishes.

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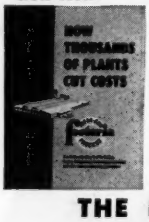

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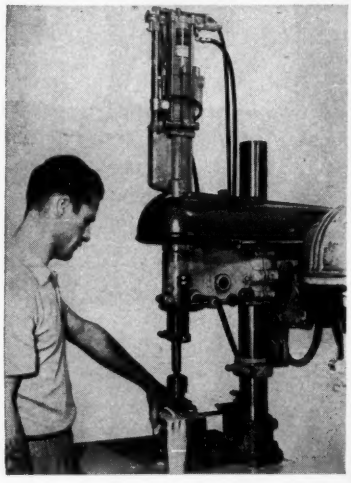
aisles, unit is adaptable to most drill presses.

Drill is fed into the work at an infinitely variable speed and to a depth of step varying from 1/32 to 5/8-inch. Automatic rapid retraction from the work helps prevent chips from falling off the drill and dropping back into the hole. When predetermined depth of hole is reached, drill withdraws. Machine shuts itself off. Unit can also be applied as a conventional drill feed through simple changeover adjustment, or it can be operated manually.



. . . uses step-by-step feeding principle

Finisher Coats Wide Range

USE REPLY CARD—CIRCLE No. 12

Material up to 48 inches wide and 3 inches thick can be coated at speeds 30 to 90 feet of linear travel per minute by the model 32-B Rollacoat finisher, made by Gasway Corp., 6465 N. Ravenswood Ave., Chicago 26, Ill. Six accessory kits make it possible to use the basic finisher unit in almost any type of production coating line where flat material is finished and controlled coating thickness is necessary.

Among accessories, a feed conveyor can be added to the feed table making it into a short belt feed unit. Delivery table conveyor can be mounted on the machine's rear to carry small finished pieces far enough away from the machine to permit them to drop onto

Giving a lift to the West

THE needs of western industry call for immense quantities of Kaiser Steel Pipe . . . which is used in a wide variety of ways.

For example, Kaiser Steel Pipe is required for such diverse uses as hydraulic car lifts, pump columns, structural columns, feeder lines, residential gas mains, pipelines to transport gas, oil and water.

Kaiser Steel Pipe is also used for plumbing, heating and ventilating systems in homes, schools, hotels, apartments and factories.

To meet all these needs, Kaiser Steel produces a complete range of pipe as part of its diversified line of steel products . . . providing a nearby, dependable source for industries that serve you.

It's good business to do business with

Kaiser Steel

built to serve the West

PROMPT, DEPENDABLE DELIVERY AT COMPETITIVE PRICES • plates • continuous weld pipe • electric weld pipe • hot rolled strip • hot rolled sheet alloy bars • carbon bars • structural shapes • cold rolled strip • special bar sections • semi-finished steels • pig iron • coke oven by-products
For details and specifications, write: **KAISER STEEL CORPORATION, LOS ANGELES, OAKLAND, SEATTLE, PORTLAND, HOUSTON, TULSA, NEW YORK**

a drying conveyor. Pair of driven feed rolls can be mounted on the machine's front in place of the feed table. Extra long feed table with multiple drive rolls can be added for handling long and heavy sheets.

Motor Line Has Volt Selector

USE REPLY CARD—CIRCLE No. 13

Line of capacitor spark, induction run motors equipped with a voltage and rotation cylinder is a development of Brown-Brockmeyer Co., Dayton 1, O. Motors are available in 1/6, ¼, ⅓, ½ and ¾ hp. They operate on 115 or 115-230-v, 50 or 60-cycle ac, single phase. Switch actuator is built without tension springs or pins. Capacitor is located inside the motor frame where it is protected from damage. Units are made open or totally enclosed.

Volt selector permits rotation or voltage change from 115 to 230-v and from clockwise to counterclockwise in about 10 seconds. Its effect is to present four different combinations in rotation and voltage from one standard motor.

Dresser Prolongs Wheel Life

USE REPLY CARD—CIRCLE No. 14

Diamond wheel dressing machine designed to prolong diamond wheel life is introduced by Eastern Tool Co., E. Hartford, Conn. Unit is mounted on a work table and engineered to dress wheels on spindles. It dresses radii, periphery and angles from plus 0.00025 to minus 0.0005-inch.

New cutting edges are exposed with a minimum stock removal. Also featured are double and single-row bearings on shaft for a positive true turning wheel. Motor is designed to give correct speed and horsepower.

Waterproof Snap-Action Switch

USE REPLY CARD—CIRCLE No. 15

A waterproof, snap-action switch incorporating potted, waterproof terminal leads and a hermetically sealed contact chamber is announced by Micro Switch, Freeport, Ill. Designated type 4HS, it makes possible the use of precision snap-action switches at locations that are subject to immersion.

Lightweight Reel Jack

USE REPLY CARD—CIRCLE No. 16

Simplex A1029, a lightweight reel jack is offered by Templeton, Kenly & Co., Chicago, Ill. It features an aluminum housing that reduces weight 21 pounds. The single-acting jack has a laminated oak T base. Its capacity is 10 tons.

Carbide Thread Ring Gages

USE REPLY CARD—CIRCLE No. 17

A line of carbide thread ring gages for volume gaging of identically sized threads is introduced by Hanson-Whitney Co., Hartford, Conn. They can be reserviced for wear and may be used as master or reference rings.

Removes Air at Boiler

USE REPLY CARD—CIRCLE No. 18

Air-Reducer, an easily installed fitting for removing air at the boiler is introduced by Trane Co., La Crosse, Wis. The brass inner tube extends the hot water sys-

Bellows Han-D-Air Clamp

Only $6.00 ea. $66. per doz.

- SAVES TIME in jig and fixture operations
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Overall Size 4" x 1½" Square

The new Bellows HAN-D-AIR CLAMP is a spring return, single acting miniature air cylinder. 1⅛" bore develops 100 lbs. of pressure at 100 lbs. of air. (Power factor 1 to 1). 1" stroke. Threaded 5/16" diameter piston rod. Universal mounting: can be mounted horizontally, vertically, side, front flange, rear flange or front pivot. Overall size 4" long by 1½" square. 1/16" heavy wall brass cylinder; ⅝" heads; oil resistant "U" cup; tension balanced spring.

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Cold-rolled strip steel is made by Weirton to satisfy the most exacting requirements of its users. Superior equipment and methods, along with complete control of materials from mine to finished strip, assure the remarkable uniformity for which Weirton is noted.

Weirton customers enjoy two important advantages—the uniform quality of Weirton steel, and the dependability of Weirton service. In short, Weirton makes good steel and gets it to you.

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DO THE NOZZLES CLOG TOO OFTEN?
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EVERYTHING IS O K!
WE ARE GETTING OAKITE SERVICE

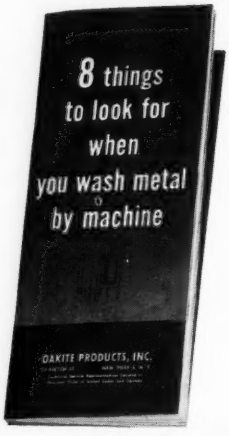
Is your washing machine removing buffing compounds as thoroughly as it removes cutting oil and metal chips?

Is it cleaning brass, aluminum and zinc die castings as well as it cleans steel?

Oakite chemists and service engineers have developed cleaning materials that meet every requirement for washing metal by machine. Oakite Technical Service Representatives know how to make these materials work at top efficiency in all types of machines.

Years of Oakite experience are compressed into a 16-page booklet called "*8 things to look for when you wash metal by machine*". You'll want to read the notes on:

- ¶ How to select the best detergent for each job. *See pages 4 to 6.*
- ¶ When to use a solvent detergent. *See page 7.*
- ¶ When to use an alkaline detergent. *See page 8.*
- ¶ How to prepare metal for painting. *See page 9.*
- ¶ Tips on selection and operation of washing machines. *See pages 10 to 12.*
- ¶ Special instrument aids to better operation. *See page 13.*



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tem's supply main below the surface of the water in the boiler, preventing air from entering piping and heating units. Air collecting at top of boiler is bled off to compression tank through outer casting.

Reamer's Shank Interchangeable

USE REPLY CARD—CIRCLE No. 19

A line of reamers, designed so that one shank is easily interchanged with a wide range of heads, is announced by Tomkins-Johnson Co., Jackson, Mich. They are available in spiral or straight flute. Head has a tapered hole that insures concentricity and a snug fit on the shank.

Kit Converts Pyrometer

USE REPLY CARD—CIRCLE No. 20

A kit containing all the parts necessary to convert a mechanical pyrometer to full electronic operation is announced by Pyrometer Service Co., N. Arlington, N. J. Convertor will fit most popular makes and is said to give stable and dependable performance.

Hand Truck Climbs Stairs

USE REPLY CARD—CIRCLE No. 21

Hand truck equipped with removable stair climbers is offered by Magline Inc., Pinconning, Mich. Fabricated completely of magnesium, unit weighs 16 pounds, has rated load capacity of 450 pounds. Mechanically joined, standard parts and assemblies provide for simple replacement and repair.

Diesel Engine Pyrometer

USE REPLY CARD—CIRCLE No. 22

A portable diesel engine pyrometer is announced by Bristol Co., Waterbury 20, Conn. It is designed for test purposes and for installations where no permanently mounted pyrometer is available. Thermocouples can be installed in each cylinder and in main exhaust line. Temperatures can then be

USE A
REPLY CARD
Just circle the corresponding number of any item in this section for more information.

INFORMATION

AVAILABLE FOR THE ASKING

71. Pump Applications

Tuthill Pump Co.—In one convenient table, the "Tuthill Pump Guide" lists the various types of Tuthill pumps, the services for which each is built, performance characteristics, types of packings, mounting styles and features which distinguish it. The 6-page folder covers pumps with capacities from 20 gph to 200 gpm.

72. Direct Fired Furnaces

Surface Combustion Corp.—Direct fuel-fired furnaces for all types of heat treat processing are subject of 4-page illustrated form SC-156. Applications of fuel-fired batch and continuous furnace designs in the ferrous and nonferrous industries are shown, and basic operating data are given for each of these examples.

73. Liquid Ejectors

Selas Corp. of America—Two revised bulletins, SC-1007 and 1008 are descriptive of Liqui-Jectors, equipment for removal of water, water-oil emulsions and dirt from compressed air and gas lines. Equipment operates without moving parts, using treated ceramic filter candles to clean air or gas without pressure drop.

74. Steel Springs

Sandvik Steel, Inc., Sandsteel Spring Div.—Features and advantages of spiral, flat reverse tempered and cross-curved steel springs are discussed in relation to use in clock mechanisms, cameras, motors, office machines, recorders, switches and timing devices in catalog sheet "Sandsteel Springs for Your Products." Flat steel bands for clamping devices, television aerials, as well as company's design service, are covered.

75. Reduction Gears

Snow-Nabstedt Gear Corp.—Part played by heavy duty S-N industrial gears in transmitting full power from the engine to the load at the most economical or necessary speed for the driven equipment is portrayed in 4-page illustrated folder. A variety of industrial and construction machinery applications is shown. Steps taken in designing, manufacturing, testing and inspecting gears are pictured. Specification sheets for entire industrial gear line are included.

76. Silicone-Insulated Welder

Metal & Thermit Corp.—What silicone insulation incorporated in M & T alternating current welders can mean to you, the user, is outlined in 4-page folder. Features of the welder, available in 200, 300, 400 and 500-amp ratings, are listed. This could be the machine for you.

77. Set Screw Catalog

Set Screw & Mfg. Co.—20-page combination catalog and reference book contains illustrations and descriptions of various types of self-locking set screws, accompanied by data on dimensions, prices, heads, points and materials. For reference, book offers thread standard tables, fit definitions and other data.

78. Centrifugal Machinery

American Machine & Metals, Inc., Tolhurst Centrifugals Div.—12-page illustrated booklet "100 years of Centrifugal Progress" traces the development of centrifugal machinery from 1852 to the present. Various applications for this type of machinery are covered.

79. Stainless Fastenings

Star Stainless Screw Co.—Detailed specifications to aid in selecting and ordering all types of screws, nuts, bolts, washers, pins, studs, rivets and nails are given in 20-page catalog 52-A. Included are diagrams and decimal equivalents of pertinent fractions and structural quality and suitability of standard stainless steels.

STEEL 7-14-52

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80. Vacuum Metallizing

F. J. Stokes Machine Co.—"Vacuum Metallizing Today" is 12-page brochure No. 725 which outlines and schematically illustrates coating process and its application to surfaces of plastics, metals, glass, paper, textiles, leathers and other products. Metallizing units are pictured along with specifications and mechanical descriptions of their construction.

81. Indexing Tables

Turner Bros., Inc.—Design features of the Hautau-Turndex automatic indexing table are described and illustrated in 8-page brochure. Also included is section with table specifications and types of Turner-designed special machinery featuring the indexing table. Application to Automation system with compound indexing fixture is included.

82. On Purchasing Tools

Standard Diamond Tool Corp.—"3 Factors To Consider when Purchasing Diamond Tools" is title of 4-page illustrated brochure. The factors—diamond, setting and cost—are expounded upon and examples of diamond tools are shown. The most efficient method of using diamond wheel dressers is illustrated.

83. Selenium Rectifiers

Syntron Co.—Illustrated 4-page literature piece describing line of "Selenium Rectifier Power Conversion Units" includes illustrations and specifications of various models available according to capacity. This equipment for changing high voltage ac to dc is packaged, ready for hookup and operation.

84. Prefabricated Pipe & Tubing

Sawhill Mfg. Co.—Many uses of prefabricted pipe and tubing, available in various sizes and types, are shown in illustrated 6-page folder "See What You Can Do with Prefabricated Pipe and Tubing." Two pages show various shapes and forms. Twenty-two ways tubing is applied to different equipment and products are covered.

85. Industrial Sanding

Sundstrand Machine Tool Co., Pneumatic Div.—Advantages of straight-line sanding action, illustrations showing how air sanders are used for various operations and specifications on four models of Sundstrand air sanders and accessories are covered in 4-page bulletin "Better, Faster Finishing for Production and Maintenance Jobs." Operations include deburring sheet metal, blending and graining stainless steel, polishing dies and numerous others.

86. Cold Processing Rolls

Tool Steel Gear & Pinion Co.—Different types of rolls made by this company for all cold processing operations of the metal industry are described and illustrated in this catalog. Section is devoted to facilities of plant and description of services company can perform.

87. Plain & Universal Shapers

Sales Service Machine Tool Co.—Interested in a plain or universal shaper with an 8-in. stroke? If so, get 4-page illustrated bulletin No. 201 on model B Shape-Rite Hy-Duty shapers. Construction details and all of the specs are given.

EDITORIAL REPRINTS:

88. Die Lubricants

What's the best die lubricant for die casting? No lubricant can solve all die problems, says V. W. Smith of G. W. Smith & Sons Inc., Dayton, but a good one can act as a corrective agent to produce good work if die or operating defects are not too serious. Get STEEL reprint "Die Lubricants Smooth Performance" which offers practical information on these lubricants, where they should be used and what to expect from them.

89. Steel Mill Instrumentation

Improvement in open-hearth furnace operation at Bethlehem Pacific Coast Steel Corp., Seattle, is attributed in part to instrumentation, according to L. W. Heinzinger in STEEL reprint entitled "Instrumentation Improves Quality of Finished Product." He tells how unbiased information afforded by instrument controls permits an accurate evaluation of the metallurgical process at the open-hearth shop and finishing mill.

90. Titanium Production

"Titanium: Big Production Gains" is title of STEEL reprint of article by C. A. Scarlott, Westinghouse Electric Corp., in which he points to the rapid developments and frequent changes in production of titanium. Output this year is expected to be about 5000 tons, nearly three times the 1951 rate. Author discusses metal's nonmilitary uses, its properties, where it comes from and how it is produced.

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checked by inserting pyrometer prongs into corresponding receptacles in terminal head of thermocouple.

Spray Gun

USE REPLY CARD—CIRCLE No. 23

Type EGA spray gun with sensitive controls for fine spraying is offered by DeVilbiss Co., Toledo, O. It is designed for small refinishing jobs, stenciling, blending, high-lighting and decorative work. Its spray pattern is medium-size and can be adjusted to pinpoint size for touch-up work.

High-Bay Reflector Lamp

USE REPLY CARD—CIRCLE No. 24

Designated R-52, a high-bay reflector lamp is announced by Sylvania Electric Products Inc., Salem, Mass. Available in ratings of 500 or 750 w, the incandescent lamps have a rated average life of 2000 hours. They have a mogul base and were designed for base-up burning positions, or within 25 degrees of vertically base up.

Oiler Reduces Oil Vapor

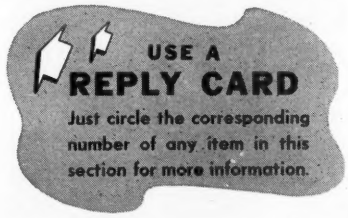
USE REPLY CARD—CIRCLE No. 25

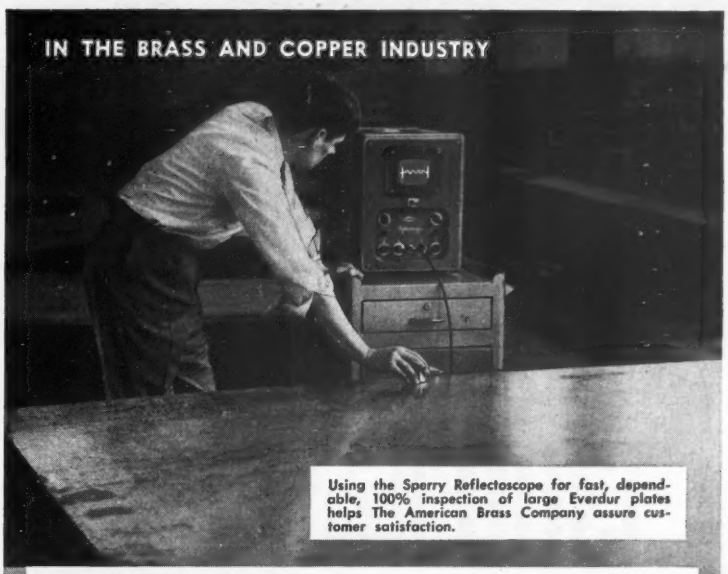
E-113 oiler, developed by Leiman Bros. Inc., Newark 5, N. J., automatically feeds measured amounts of oil to air pumps. It provides adequate lubrication of wings and vanes and delivered air is virtually oil-free. It feeds any oil from SAE 10 to SAE 70.

Precleaner for Steel

USE REPLY CARD—CIRCLE No. 26

Detrex 61, a compound designed for use as a precleaner for steel that is to be deep drawn or extruded is announced by Detrex Corp., Detroit 32, Mich. It is used in a soak tank at approximately 190° F at a concentration from 6 to 10 ounces per gallon. It completely removes oil, grease and dirt from all ferrous parts. Compound is free rinsing.





Using the Sperry Reflectoscope for fast, dependable, 100% inspection of large Everdur plates helps The American Brass Company assure customer satisfaction.

The versatile Reflectoscope is here used by The American Brass Company to inspect cupro-nickel condenser plates.

Reflectoscope testing of work rolls protects against failure on the job with consequent work spoilage.

NO REJECTS
Since Installing
Sperry
ULTRASONIC TESTING

Two years ago The American Brass Company adopted Sperry Ultrasonic Reflectoscope testing for their Everdur plate. Since that time, *not a single plate* has been rejected by a customer. Accurately and dependably locating laminations and other internal defects not detectable by visual inspection, the Reflectoscope provides rapid, nondestructive testing that helps to maintain an enviable reputation for uniform high quality.

Penetrating up to 24 feet in solid metal, the Reflectoscope is also used to inspect a wide variety of other forms and materials in the brass and copper industry.

Learn how you can reduce testing costs and improve quality control in your plant. Write today for complete information about the Sperry Reflectoscope . . . for sale, or for lease. *Ask about Sperry's day to day Testing Service.*

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SPERRY PRODUCTS, INC.
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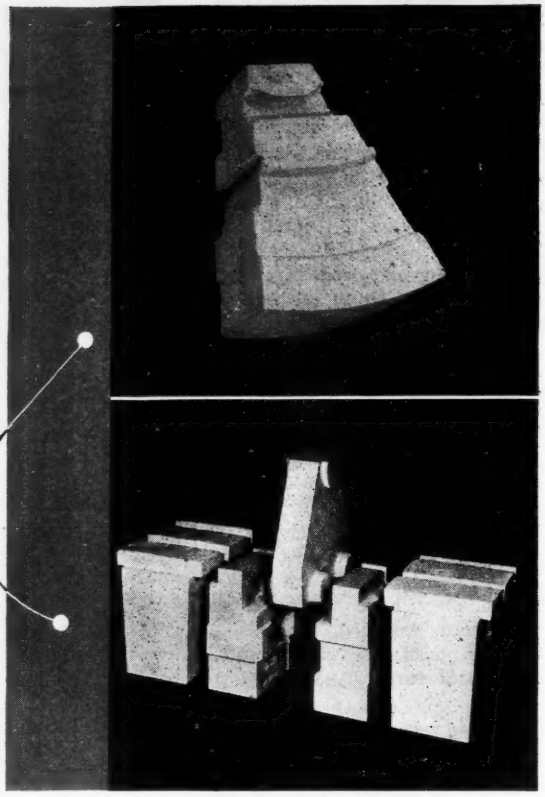
Danbury, Connecticut
REPRESENTATIVES IN PRINCIPAL CITIES

PE 84 nose tile made of LACO "600" special refractory



1000 to 1300 Heats

at ¼ the cost

with LACO "600" Special Refractory

Tile components, Laclede tile suspended arch

Records up to 1340 heats on Noses and Fan Tails have been reported by large Eastern steel mills using LACO "600" special refractory in Open Hearths and in hot zones of Slab Heating Furnaces.

Now proven in performance, LACO "600" was field tested for over ten years in advanced Open Hearth designs on new furnaces and rebuilds. *Of 28 furnaces equipped by Laclede Arch Company in the last two years,* ranging in size from 165 tons capacity to 275 tons capacity, most are utilizing LACO "600" on fan tails, noses, chill walls, or burner arches.

LACO "600" cuts heat losses, keeps maintenance expenses down, costs less to install and has long service life, improves furnace operation, reduces air infiltration, saves *time* and money. **It costs one-quarter as much as expensive chrome and magnesite brick sometimes used in Fan Tail and Nose construction.**

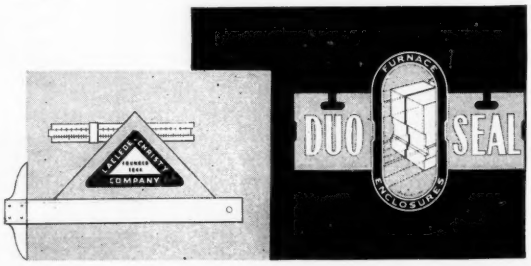
Yes, these locations have tough operating conditions, but LACO "600" special refractory meets these conditions with service and economy. Why does a clay brick costing so little perform so well?

The answer, backed up by ten years of field tests, lies in the unique combination of refractory properties, high resistance to spalling, excellent volume stability, high melting point, uniformity, **plus the method of suspension.** All of this adds up to *increased furnace availability at the right price.*

Let's go **downstairs** to cut costs and step up production and furnace availability with *Suspended* LACO "600".

Every type of refractory or suspension has its proper economical place.

Let us show you some designs and performance records.



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The Market Outlook

THE STEEL STRIKE may not make it as difficult to get steel as you may think!

Sounds contradictory, doesn't it, to the assumption of many people, including Defense Production Administrator Henry H. Fowler, that the strike is only rebuilding a steel shortage?

What they're assuming is that a strike is inflationary. They're perhaps basing their assumption on what has happened in the last ten years. In most cases during that period of heavy demand for goods and services it has appeared that a short strike merely delayed the fulfillment of demand.

INFLATIONARY?—But this steel strike has been a long one. It rounded out six weeks today. That's about as long as any general strike has run in the steel industry. At least $2.4 billion has already been lost from the strike. This amount will rise as effects of the strike fan out through industry. Is a loss like that inflationary? Looks to be just the opposite.

CASE STUDY— Those who think a big steel demand is being piled up awaiting the end of the steel strike assume that everyone will continue to be in the market for all that they would have been had there been no steel strike. But will they? Take the case of the millwright at a Cleveland steel mill. He planned to buy a new automobile and go away for a summer vacation. Because he already has lost six weeks' pay he can't do either. And he isn't in as bad a position economically as many steelworkers. His wife is working and they have no children to support. What about the steelworker with four kids? It looks as though a lot of automobiles, refrigerators and loads of other goods made from steel will be lacking customers. That deflationary influence could take considerable pressure off the demand for steel. Watch it!

LESS BUOYANT—Before the current steel strike started, business in general had subsided somewhat and steel supply and demand were getting closely enough in balance that the government was easing up on controls over materials. This suggests that some of the buoyant characteristics that might have otherwise attended this strike are not present.

Of course there'll be a flurry of pressure for immediate deliveries of steel once the strike is over. The government will see that defense uses get first call. Already the government is directing the flow of steel from unstruck mills. One of its directives requires Weirton Steel Co. to produce in July, August and September canner quality tin plate for sanitary cans for the perishable food crop. The directive takes all of the production and inventory of the tin plate mill as far as practicable. Now being planned is a directive to make all of the Pittsburgh Steel Co.'s pipe production available for distribution for emergency needs of the petroleum industry.

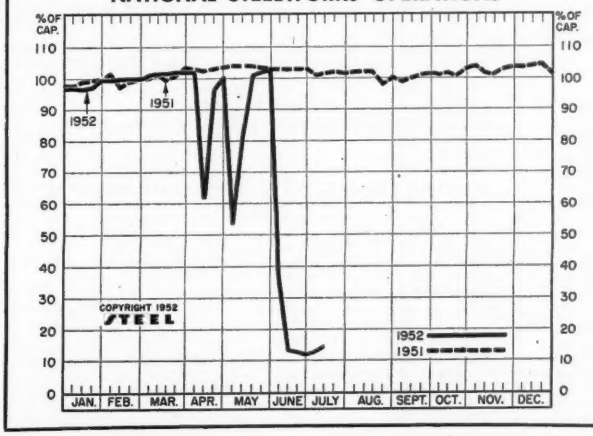
IMMUNE TO CRISES—Despite the seriousness of the strike, panicky demands for deliveries before the strike and for preference in shipments after the strike have been notably absent. A San Francisco steel warehouseman summed it up thusly: "People are getting immune to crises." You can even find cases where available steel is being turned down. One reason for this is unbalanced steel stocks.

NOT SO ROSY—Looking ahead to fulfillment of their steel needs in the rush right after steel production resumes, some automotive manufacturers and an occasional appliance maker are inquiring for conversion steel. It may be hard to get. The bulk of such ingots come from electric furnaces. Most of these furnaces already are committed for producing alloy steels needed for the defense program.

SNOWBALLING—As the steelworkers' strike wore on, the loss in steel production from the three stoppages this year climbed to 12.7 million net tons of steel for ingots and castings. Another week would make the loss almost as great as the total output of steel in the depression year of 1932. Production then was 15.3 million tons.

STEEL's estimate of output rose 2 points to 14.5 per cent of capacity in the week ended July 12.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

Percentage of Capacity Engaged at Leading Production Points

	Week Ended July 12	Change	Same Week 1951	Same Week 1950
Pittsburgh	8	+ 3	97	98.5
Chicago	5.5	— 1.5	106.5	101
Mid-Atlantic	17	0	101	96.5
Youngstown	6	+ 6	105	107
Wheeling	49.5	— 0.5	97	102.5
Cleveland	0	0	96.5	63
Buffalo	0	0	104	104
Birmingham	0.5	0	100	100
New England	20	0	56	60
Cincinnati	36.5	+ 4.5	104	98
St. Louis	33.5	+ 2.5	90.5	84.5
Detroit	49	0	100	105
Western	33	0	101	95
Estimated national rate	14.5	+ 2	101.5	95

Based on weekly steelmaking capacity of 2,077,040 tons in 1952; 1,999,034 tons for 1951; 1,928,721 tons for second half, 1950; 1,906,268 tons for first half, 1950.

* Change from revised rate for preceding week.

The Metalworking Outlook—p. 47 Production-Engineering News—p. 83

Composite Market Averages

	July 10 1952	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
FINISHED STEEL INDEX, Weighted:					
Index (1935-39 av.=100) ..	171.92†	171.92†	171.92†	171.92	118.67
Index in cents per lb.	4.657†	4.657†	4.657†	4.657	3.215
ARITHMETICAL PRICE COMPOSITES:					
Finished Steel, NT	$106.32†	$106.32†	$106.32†	$106.32	$69.82
No. 2 Fdry, Pig Iron, GT..	52.54	52.54	52.54	52.54	32.99
Basic Pig Iron, GT	52.16	52.16	52.16	52.16	32.49
Malleable Pig Iron, GT ...	53.27	53.27	53.27	53.27	33.71
Steelmaking Scrap, GT ...	42.48	42.33	43.00	44.00	35.50

Weighted finished steel index based on average shipments and Pittsburgh district prices of the following 14 representative products during 5-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

† Preliminary, pending 1952 tin plate contract price announcement.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	July 10 1952	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	3.70	3.70	3.70	3.70	2.60
Bars, H.R., Chicago	3.70	3.70	3.70	3.70	2.60
Bars, H.R., del. Philadelphia	4.252	4.252	4.252	4.20	2.98
Bars, C.F., Pittsburgh	4.55	4.55	4.55	4.55	3.20
Shapes, Std., Pittsburgh ..	3.65	3.65	3.65	3.65	2.50
Shapes, Std., Chicago	3.65	3.65	3.65	3.65	2.50
Shapes, del. Philadelphia ..	3.93	3.93	3.93	3.91	2.64
Plates, Pittsburgh	3.70	3.70	3.70	3.70	2.65
Plates, Chicago	3.70	3.70	3.70	3.70	2.65
Plates, Coatesville, Pa. ...	4.15	4.15	4.15	4.15	2.80
Plates, Sparrows Point, Md.	3.70	3.70	3.70	3.70	2.65
Plates, Claymont, Del.	4.15	4.15	4.15	4.15	2.80
Sheets, H.R., Pittsburgh ..	3.60–75	3.60–75	3.60–75	3.60–75	2.50
Sheets, H.R., Chicago	3.60	3.60	3.60	3.60	2.50
Sheets, C.R., Pittsburgh ..	4.35	4.35	4.35	4.35	3.20
Sheets, C.R., Chicago	4.35	4.35	4.35	4.35	3.20
Sheets, C.R., Detroit	4.55	4.55	4.55	4.55	3.35
Sheets, Galv., Pittsburgh ..	4.80	4.80	4.80	4.80	3.55
Strip, H.R., Pittsburgh ...	3.75-4.00	3.75-4.00	3.75-4.00	3.75-4.00	2.50
Strip, H.R., Chicago	3.50	3.50	3.50	3.50	2.50
Strip, C.R., Pittsburgh	4.65-5.35	4.65-5.35	4.65-5.35	4.65-5.35	3.20
Strip, C.R., Chicago	4.90	4.90	4.90	4.90	3.30
Strip, C.R., Detroit	4.85-5.60	4.85-5.60	4.85-5.60	4.35-5.60	3.35
Wire, Basic, Pittsburgh ...	4.85-5.10	4.85-5.10	4.85-5.10	4.85-5.10	3.425
Nails, Wire, Pittsburgh ...	5.90-6.20	5.90-6.20	5.90-6.20	5.90-6.20	4.125
Tin plate box, Pittsburgh..	$8.70	$8.70	$8.70	$8.70	$5.75

SEMIFINISHED

Billets, forging, Pitts. (NT)	$66.00	$66.00	$66.00	$66.00	$50.00
Wire rods, ⅜-⅝", Pitts. ..	4.10–30	4.10–30	4.10–30	4.10–30	2.55

PIG IRON, Gross Ton

Bessemer, Pitts.	$53.00	$53.00	$53.00	$53.00	$34.00
Basic, Valley	52.00	52.00	52.00	52.00	33.00
Basic, del. Phila.	56.75	56.75	56.75	56.49	35.72
No. 2 Fdry, Pitts.	52.50	52.50	52.50	52.50	33.50
No. 2 Fdry, Chicago	52.50	52.50	52.50	52.50	33.00
No. 2 Fdry, Valley	52.50	52.50	52.50	52.50	33.50
No. 2 Fdry, del. Phila. ...	57.25	57.25	57.25	56.99	36.54
No. 2 Fdry, Birm.	48.88	48.88	48.88	48.88	29.88
No. 2 Fdry (Birm.) del. Cin.	56.43	56.43	56.43	55.33	34.75
Malleable, Valley	52.50	52.50	52.50	52.50	33.50
Malleable, Chicago	52.50	52.50	52.50	52.50	33.50
Charcoal, Lyles, Tenn.	66.00	66.00	66.00	66.00	43.00
Ferromanganese, Etna, Pa.	188.00	188.00	188.00	188.00	140.25*

* F.o.b. cars, Pittsburgh.

SCRAP, Gross Ton (including broker's commission)

No. 1 Heavy Melt, Pitts...	$44.00	$44.00	$44.00	$45.00	$35.25
No. 1 Heavy Melt, E. Pa...	41.00	40.50	42.50	43.50	37.50
No. 1 Heavy Melt, Chicago.	42.50	42.50	42.50	43.50	33.75
No. 1 Heavy Melt, Valley..	44.00	44.00	44.00	45.00	36.50
No. 1 Heavy Melt, Cleve...	43.00	43.00	43.00	44.00	37.75
No. 1 Heavy Melt, Buffalo.	37.00*	37.00*	43.00	44.00	33.50
Rails, Rerolling, Chicago...	52.50	52.50	52.50	52.50	40.50
No. 1 Cast, Chicago	45.00	45.00	45.00	49.00†	39.00

* Nominal. † F.o.b. shipping point.

COKE, Net Ton

Beehive, Furn, Connlsvl. ..	$14.75	$14.75	$14.75	$14.75	$9.50-10.50
Beehive, Fdry, Connlsvl. ..	17.50	17.50	17.50	17.50	9.75–12.00
Oven Fdry, Chicago	23.00	23.00	23.00	21.00	16.10

NONFERROUS METALS

Copper, del. Conn.	24.50	24.50	24.50	24.50	21.50
Zinc, E. St. Louis	15.00	15.00	16.00	17.50	10.50
Lead, St. Louis	15.80	15.80	14.80	16.80	14.80-14.85
Tin, New York	121.50	121.50	121.50	106.00	80.00
Aluminum, del.	19.00	19.00	19.00	19.00	15.00
Antimony, Laredo, Tex. ..	39.00	39.00	39.00	42.00	33.00
Nickel, refinery, duty paid.	56.50	56.50	56.50	56.50	35.00

PIG IRON

F.o.b. furnace prices quoted under GCPR as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax. Key to producing companies published on second following page.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem,Pa. B2	$54.00	$54.50	$55.00	$55.50
NewYork, del.	....	58.28	58.78	....
Newark, del.	57.02	57.52	58.02	58.52
Philadelphia, del.	56.75	57.25	57.75	58.25
Birmingham District				
AlabamaCity,Ala. R2	48.38	48.88	....	....
Birmingham R2	48.38	48.88	....	....
Birmingham S9	48.38	48.88	....	....
Woodward,Ala. W15	48.38	48.88	....	....
Cincinnati, del.	....	56.43	....	....
Buffalo District				
Buffalo R2	52.00	52.50	53.00	....
Buffalo H1	52.00	52.50	53.00	....
Tonawanda,N.Y. W12	52.00	52.50	53.00	....
No.Tonawanda,N.Y. T9	....	52.50	53.00	....
Boston, del.	62.65	63.15	63.65	....
Rochester,N.Y., del.	55.02	55.52	56.02	....
Syracuse,N.Y., del.	56.12	56.62	57.12	....
Chicago District				
Chicago I-3	52.00	52.50	52.50	53.00
Gary,Ind. U5	52.00	....	52.50	....
IndianaHarbor,Ind. I-2	52.00	....	52.50	....
So.Chicago,Ill. W14	52.00	52.50	52.50	....
So.Chicago,Ill. Y1	52.00	52.50	52.50	....
So.Chicago,Ill. U5	52.00	....	52.50	53.00
Milwaukee, del.	54.17	54.67	54.67	55.17
Muskegon,Mich., del.	....	58.80	58.80	....
Cleveland District				
Cleveland A7	52.00	52.50	52.50	53.00
Cleveland R2	52.00	52.50	52.50	....
Akron,O., del. from Cleve.	54.61	55.11	55.11	55.61
Lorain,O. N3	52.00	....	....	53.00
Duluth I-3	....	....	52.50	....
Erie,Pa. I-3	52.00	52.50	52.50	53.00
Everett,Mass. E1	....	59.75	60.25	....
Fontana,Calif. K1	58.00	58.50	....	....
Seattle,Tacoma, Wash., del.	....	60.66	....	....
Portland,Oreg., del.	....	60.66	....	....
LosAngeles,SanFrancisco, del.	60.16	60.66	....	....
GraniteCity,Ill. G4	53.90	54.40	54.90	....
St.Louis, del. (inc. tax)	54.65	55.15	55.65	....
Ironton,Utah C11	52.00	52.50	....	....
Geneva,Utah C11	52.00	52.50	....	....
LoneStar,Tex. L6	48.00	*48.50	48.50	....
Minnequa,Colo. C10	54.00	55.00	55.00	....
Pittsburgh District				
NevilleIsland,Pa. P6	....	52.50	52.50	53.00
Pitts., N.&S. sides, Ambridge, Aliquippa, del.	....	53.87	53.87	54.37
McKeesRocks, del.	....	53.54	53.54	54.04
Lawrenceville, Homestead, Wilmerding, Monaca, del.	....	54.16	54.16	54.66
Verona, Trafford, del.	....	54.69	54.69	55.19
Brackenridge, del.	....	54.95	54.95	55.45
Bessemer,Pa. U5	52.00	....	52.50	53.00
Clairton,Rankin,So.Duquesne,Pa. U5	52.00	....	....	....
McKeesport,Pa. N3	52.00	....	....	53.00
Monessen,Pa. P7	54.00	....	....	....
Sharpsville,Pa. S6	....	....	52.50	53.00
Steelton,Pa. B2	54.00	54.50	55.00	55.50
Swedeland,Pa. A3	56.00	56.50	57.00	57.50
Toledo,O. I-3	52.00	52.50	52.50	53.00
Cincinnati, del.	57.47	57.97	....	....
Troy,N.Y. R2	54.00	54.50	55.00	55.50
Youngstown District				
Hubbard,O. Y1	52.00	52.50	52.50	....
Youngstown Y1	52.00	52.50	52.50	....
Youngstown U5	52.00	....	....	53.00
Mansfield,O., del.	56.65	57.15	57.15	57.65

* Low phos, southern grade.

PIG IRON DIFFERENTIAL

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.0-6.50% silicon; add $1.50 for each 0.5% Si)

Jackson,O. G2, J1	$62.50
Buffalo H1	63.75

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for each 0.045% max. P)

NiagaraFalls,N.Y. P15	$88.00
Keokuk,Iowa, Openhearth & Fdry, frt. allowed K2	92.50
Keokuk, OH & Fdry., 12½ lb pigiets, 16% Si, frt. allowed K2	95.50
Wenatchee,Wash., OH & Fdry., frt. allowed K2	92.50

CHARCOAL PIG IRON, Gross Ton

(Low phos semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 & 6)

Lyles,Tenn. T3	$66.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$57.00
Steelton,Pa. B2	60.00
Philadelphia delivered	63.55
Troy,N.Y. R2	60.00

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Semifinished and Finished Steel Products

Mill prices quoted under GCPR as reported to STEEL, July 10, 1952; cents per pound except as otherwise noted. Changes shown in italics. Code numbers following mill points indicate producing company; key on next two pages.

INGOTS, Carbon, Forging (NT)
Fontana,Calif. K1 ..$79.00
Munhall,Pa. U5 .....52.00
Seattle S24 .....73.00

INGOTS, Alloy (NT)
Detroit R7 .....$54.00
Fontana,Calif. K1 ....80.00
Houston S5 .....62.00
Midland,Pa. C18 ....54.00
Munhall,Pa. U5 .....54.00
Seattle S24 .....80.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 ....$56.00
Clairton,Pa. U5 .....56.00
Ensley,Ala. T2 .....56.00
Fairfield,Ala. T2 ....56.00
Fontana,Calif. K1 ....75.00
Gary,Ind. U5 .....56.00
Johnstown,Pa. B2 ....56.00
Lackawanna,N.Y. B2..56.00
Munhall,Pa. U5 .....56.00
So.Chicago,Ill. U5 ....56.00
So.Duquesne,Pa. U5 ..56.00

Carbon,Forging (NT)
Bessemer,Pa. U5 ....$66.00
Buffalo R2 .....66.00
Canton,O. R2 .....66.00
Clairton,Pa. U5 .....66.00
Cleveland R2 .....66.00
Conshohocken,Pa. A3..73.00
Detroit R7 .....69.00
Ensley,Ala. T2 .....66.00
Fairfield,Ala. T2 ....66.00
Fontana,Calif. K1 ....85.00
Gary,Ind. U5 .....66.00
Geneva,Utah C11 .....66.00
Houston S5 .....74.00
Johnstown,Pa. B2 ....66.00
Lackawanna,N.Y. B2..66.00
LosAngeles B3 .....85.00
Munhall,Pa. U5 .....66.00
Seattle B3 .....85.00
So.Chicago R2,U5,W14.66.00
So.Duquesne,Pa. U5 ..66.00
So.SanFrancisco B3 ..85.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ...$70.00
Buffalo R2 .....70.00
Canton,O. R2 .....70.00
Canton,O.(29) T7 ....66.00
Conshohocken,Pa. A3..77.00
Detroit R7 .....73.00
Fontana,Calif. K1 ....89.00
Gary,Ind. U5 .....70.00
Houston S5 .....78.00
Ind.Harbor,Ind. Y1 ...70.00
Johnstown,Pa. B2 ....70.00
Lackawanna,N. Y. B2..70.00
LosAngeles B3 .....90.00
Massillon,O. R2 .....70.00
Midland,Pa. C18 .....70.00
Munhall,Pa. U5 .....70.00
So.Chicago R2,U5,W14.70.00
So.Duquesne,Pa. U5 ..70.00
Struthers,O. Y1 .....70.00
Warren,O. C17 .....70.00

ROUNDS, SEAMLESS TUBE (NT)
Canton,O. R2 .....$82.00
Cleveland R2 .....82.00
Fontana,Calif. K1 ....103.00
Gary,Ind. U5 .....82.00
Massillon,O. R2 .....82.00
So.Chicago,Ill. R2 ...82.00
So.Duquesne,Pa. U5 ..82.00

SHEET BARS (NT)
Fontana,Calif. K1 ...$89.00

SKELP
Aliquippa,Pa. J5 ....$3.45
Munhall,Pa. U5 .....3.35
Warren,O. R2 .....3.35
Youngstown R2, U5 ..3.35

WIRE RODS
Alton,Ill. L1 .....4.40
AlabamaCity,Ala. R2 ..4.10
Buffalo W12 .....4.10
Cleveland A7 .....4.10
Donora,Pa. A7 .....4.10
Fairfield,Ala. T2 .....4.10
Fontana,Calif. K1 ....4.90
Houston S5 .....4.50
Johnstown,Pa. B2 ....4.10
Joliet,Ill. A7 .....4.10
LosAngeles B3 .....4.90
Minnequa,Colo. C10 ....4.35
Monessen,Pa. P7 .....4.30
No.Tonawanda,N.Y. B11.4.10
Pittsburg,Calif. C11 ...4.75
Portsmouth,O. P12 ....4.30
Roebling,N.J. R5 .....4.20
So.Chicago,Ill. R2 ....4.10
SparrowsPoint,Md. B2..4.20
Sterling,Ill.(1) N15 ...4.10
Struthers,O. Y1 .....4.10
Torrance,Calif. C11 ...4.90
Worcester,Mass. A7 ...4.40

SHEET STEEL PILING
Ind.Harbor,Ind. I-2 ...4.45
Lackawanna,N.Y. B2 ...4.45
Munhall,Pa. U5 .....4.45
So.Chicago,Ill. U5 ....4.45

STRUCTURALS
Carbon Steel Stand. Shapes
AlabamaCity,Ala. R2 ..3.60
Aliquippa,Pa. J5 ....3.65
Bessemer,Ala. T2 .....3.65
Bethlehem,Pa. B2 ....3.70
Clairton,Pa. U5 .....3.65
Fairfield,Ala. T2 .....3.65
Fontana,Calif. K1 ....4.25
Gary,Ind. U5 .....3.65
Geneva,Utah C11 .....3.65
Houston S5 .....4.05
Ind.Harbor,Ind. I-2 ...3.65
Johnstown,Pa. B2 ....3.70
KansasCity,Mo. S5 ....4.25
Lackawanna,N.Y. B2 .3.70
LosAngeles B3 .....4.25
Minnequa,Colo. C10 ....4.10
Munhall,Pa. U5 .....3.65
Niles,Calif.(22) P1 ...4.85
Phoenixville,Pa. P4 ...5.90
Portland,Oreg. O4 ....4.50
Seattle B3 .....4.30
So.Chicago,Ill. U5 W14..3.65
So.SanFrancisco B3 ...4.20
Torrance,Calif. C11 ....4.25
Weirton,W. Va. W6 ....3.90

Alloy Stand. Shapes
Clairton,Pa. U5 .....4.35
Fontana,Calif. K1 ....5.55
Munhall,Pa. U5 .....4.35
So.Chicago,Ill. U5 ....4.35

H.S., L.A. Stand. Shapes
Aliquippa,Pa. J5 .....5.50
Bessemer,Ala. T2 .....5.50
Bethlehem,Pa.(14) B2 ..5.50
Clairton,Pa. U5 .....5.50
Fairfield,Ala. T2 .....5.50
Fontana,Calif. K1 ....6.10
Gary,Ind. U5 .....5.50
Geneva,Utah C11 .....5.50
Ind.Harbor,Ind. I-2 ...5.50
Ind.Harbor,Ind. Y1 ...6.00
Johnstown,Pa. B2 .....5.50
Lackawanna,N.Y.(14)B2 5.50
LosAngeles B3 .....6.05
Munhall,Pa. U5 .....5.50
Seattle B3 .....6.10
So.Chicago,Ill. U5 ....5.50
So.SanFrancisco B3 ...6.00
Struthers,O. Y1 .....6.00

Wide Flange
Bethlehem,Pa. B2 ....3.70
Clairton,Pa. U5 .....3.65
Fontana, Calif. K1 .....5.55
Lackawanna,N.Y. B2 ..3.70
Munhall,Pa. U5 .....3.65
So.Chicago,Ill. U5 .....3.65

H.S., L.A. Wide Flange
Aliquippa,Pa. J5 .....5.50
Lackawanna,N.Y. B2 ..5.50
Munhall,Pa. U5 .....5.45
So.Chicago,Ill. U5 .....5.45

BEARING PILES
Munhall,Pa. U5 .....3.65
So.Chicago,Ill. U5 .....3.65

PLATES,High-Strength Low-Alloy
Aliquippa,Pa. J5 .....5.65
Bessemer,Ala. T2 .....5.65
Clairton,Pa. U5 .....5.65
Cleveland J5, R2 .....5.65
Conshohocken,Pa. A3 ..5.90
Fairfield,Ala. T2 .....5.65
Fontana,Calif.(30) K1..6.25
Gary,Ind. U5 .....5.65
Geneva,Utah C11 .....5.65
Ind.Harbor,Ind. I-2 ...5.65
Ind.Harbor,Ind. Y1 ...6.15
Johnstown,Pa. B2 ....5.65
Munhall,Pa. U5 .....5.65
Pittsburgh J5 .....5.65
Seattle B3 .....6.55
Sharon,Pa. S3 .....5.70
So.Chicago,Ill. U5 ....5.65
SparrowsPoint,Md. B2 .5.65
Warren,O. R2 .....5.65
Youngstown Y1 .....6.15

PLATES, Open-Hearth Alloy
Claymont,Del. C22 ....4.85
Coatesville,Pa. L7 .....5.25
Conshohocken,Pa. A3 ...5.05
Fontana,Calif. K1 .....5.70
Gary,Ind. U5 .....4.75
Johnstown,Pa. B2 .....4.75
Munhall,Pa. U5 .....4.75
Sharon,Pa. S3 .....5.20
So.Chicago,Ill. U5 ....4.75
SparrowsPoint,Md. B2 .4.75

FLOOR PLATES
Cleveland J5 .....4.75
Conshohocken,Pa. A3 ...4.75
Ind.Harbor,Ind. I-2 ...4.75
Munhall,Pa. U5 .....4.75
So.Chicago,Ill. U5 .....4.75

PLATES, Ingot Iron
Ashland,c.l. (15) A10 .3.95
Ashland,l.c.l. (15) A10..4.35
Cleveland,c.l. R2 .....4.30
Warren,O.,c.l. R2 .....4.30

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..3.70
Aliquippa,Pa. J5 .....3.70
Ashland,Ky. (15) A10 ..3.70
Bessemer,Ala. T2 .....3.70
Clairton,Pa. U5 .....3.70
Claymont,Del. C22 ....4.15
Cleveland J5, R2 .....3.70
Coatesville,Pa. L7 .....4.15
Conshohocken,Pa. A3 ...4.15
Fairfield,Ala. T2 .....3.70
Fontana,Calif.(30) K1 ..4.30
Gary,Ind. U5 .....3.70
GraniteCity,Ill. G4 ....4.40
Geneva,Utah C11 .....3.70
Harrisburg,Pa. C5 .....6.30
Houston S5 .....4.10
Ind.Harbor,Ind. I-2, Y1..3.70
Johnstown,Pa. B2 .....3.70
Lackawanna,N.Y. B2 ..3.70
Minnequa,Colo. C10 ....4.50
Munhall,Pa. U5 .....3.70
Pittsburgh J5 .....3.70
Seattle B3 .....4.60
Sharon,Pa. S3 .....3.95
So.Chicago,Ill. U5 W14..3.70
SparrowsPoint,Md. B2 ..3.70
Steubenville,O. W10 ....3.70
Warren,O. R2 .....3.70
Weirton,W.Va. W6 .....4.00
Youngstown R2, U5, Y1..3.70

PLATES, Carbon A.R.
Fontana,Calif. K1 .....5.45
Geneva,Utah C11 .....4.85

PLATES, Wrought Iron
Economy,Pa. B14 .....8.60

BARS, Hot-Rolled Carbon
AlabamaCity,Ala. R2 ..3.70
Aliquippa,Pa. J5 .....3.70
Alton,Ill. L1 .....4.15
Atlanta,Ga. A11 .....4.25
Bessemer,Ala. T2 .....3.70
Buffalo R2 .....3.70
Canton,O. R2 .....3.70
Clairton,Pa. U5 .....3.70
Cleveland R2 .....3.70
Detroit R7 .....3.85
Emeryville,Calif. J7 ....4.45
Fairfield,Ala. T2 .....3.70
Fontana,Calif. K1 .....4.40
Gary,Ind. U5 .....3.70
Houston S5 .....4.10
Ind.Harbor,Ind. I-2, Y1.3.70
Johnstown,Pa. B2 .....3.70
KansasCity,Mo. S5 .....4.30
Lackawanna,N.Y. B2 ..3.70
LosAngeles B3 .....4.40
Milton,Pa. B6 .....4.55
Minnequa,Colo. C10 ....4.15
Niles,Calif. P1 .....5.05
N.Tonawanda,N.Y. B11..3.70
Pittsburg,Calif. C11 ....4.40
Pittsburgh J5 .....3.70
Portland,Oreg. O4 .....4.65
Seattle B3, N14 .....4.45
So.Chicago R2, U5, W14.3.70
So.Duquesne,Pa. U5 .....3.70
So.SanFran.,Cal. B3 ....4.45
Struthers,O. Y1 .....3.70
Torrance,Calif. C11 ....4.40
Weirton,W.Va. W6 .....3.85
Youngstown R2, U5 ....3.70

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 .....3.70
Atlanta A11 .....4.25
Johnstown,Pa. B2 .....3.70
Lackawanna,N.Y. B2 ..3.70
Niles,Calif. P1 .....5.05
Portland,Oreg. O4 .....4.65
SanFrancisco S7 .....4.85

BAR SIZE ANGLES; H.R.CARBON
Bethlehem,Pa. B2 .....3.90

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 .....4.30
Buffalo R2 .....4.30
Canton,O. R2 .....4.30
Canton,O.(29) T7 .....3.95
Clairton,Pa. U5 .....4.30
Detroit R7 .....4.45
Ecorse,Mich. G5 .....4.65
Fontana,Calif. K1 .....5.35
Gary,Ind. U5 .....4.30
Houston S5 .....4.70
Ind.Harbor,Ind. I-2, Y1.4.30
Johnstown,Pa. B2 .....4.30
KansasCity,Mo. S5 .....4.90
Lackawanna,N.Y. B2 ..4.30
LosAngeles B3 .....5.35
Massillon,O. R2 .....4.30
Midland,Pa. C18 .....4.30
So.Chicago R2, U5, W14.4.30
So.Duquesne,Pa. U5 ....4.30
Struthers,O. Y1 .....4.30
Warren,O. C17 .....4.30
Youngstown U5 .....4.30

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 .....4.55
Gary,Ind. U5 .....4.55
Youngstown U5 .....4.55

BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy
Aliquippa,Pa. J5 .....5.55
Bessemer,Ala. T2 .....5.55
Bethlehem,Pa. B2 .....5.55
Clairton,Pa. U5 .....5.55
Cleveland R2 .....5.55
Fairfield,Ala. T2 .....5.55
Fontana,Calif. K1 .....6.60
Gary,Ind. U5 .....5.55
Ind.Harbor,Ind. I-2 ....5.55
IndianaHarbor,Ind. Y1 ..6.05
Johnstown,Pa. B2 .....5.55
Lackawanna,N.Y. B2 ..5.55
LosAngeles B3 .....6.25
Pittsburgh J5 .....5.55
Seattle B3 .....6.30
So.Duquesne,Pa. U5 ....5.55
So.SanFrancisco B3 ....6.30
Struthers,O. Y1.....6.05
Youngstown U5 .....5.55

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 .....4.55
BeaverFalls,Pa. M12, R2 4.55
Buffalo B5 .....4.60
Camden,N.J. P13 .....5.00
Carnegie,Pa. C12 .....4.55
Chicago W18 .....4.55
Cleveland A7, C20 .....4.55
Detroit P17 .....4.70
Donora,Pa. A7 .....4.55
Elyria,O. W8 .....4.55
FranklinPark,Ill. N5 ....4.55
Gary,Ind. R2 .....4.55
GreenBay,Wis. R7 .....4.55
Hammond,Ind. L2, M13.4.55
Hartford,Conn. R2 .....5.10
Harvey,Ill. B5 .....4.55
LosAngeles R2 .....6.00
Mansfield,Mass. B5 ....5.10
Massillon,O. R2, R8.....4.55
Monaca,Pa. S17 .....4.55
Newark,N.J. W18 .....5.00
Plymouth,Mich. P5 ....4.80
Pittsburgh J5 .....4.55
Putnam,Conn. W18 ....5.10
Readville,Mass. C14 ....5.10
St.Louis,Mo. M5 .....4.95
So.Chicago,Ill. W14 ....4.55
SpringCity.Pa.(5) K3 ...5.00
Struthers,O. Y1 .....4.55
Waukegan,Ill. A7 .....4.55
Youngstown F3, Y1 ....4.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 .....5.40
BeaverFalls,Pa. M12 ....5.40
Bethlehem,Pa. B2 .....5.40
Buffalo B5 .....5.40
Camden,N.J. P13 .....5.80
Canton,O. R2 .....5.40
Canton,O.(29) T7 .....4.90
Carnegie,Pa. C12 .....5.40
Chicago W18 .....5.40
Cleveland A7 .....5.45
Cleveland C20 .....5.40
Detroit P17 .....5.55
Donora,Pa. A7 .....5.45
Elyria,O. W8 .....5.40
Gary,Ind. R2 .....5.40
Hammond,Ind. L2, M13.5.40
Hartford,Conn. R2 .....5.85
Harvey,Ill. B5 .....5.40
Lackawanna,N.Y. B2 ...5.40
Mansfield,Mass B5 .....5.85
Massillon,O. R2, R8 ....5.40
Midland,Pa. C18 .....5.40
Monaca,Pa. S17 .....5.40
Newark,N.J. W18 .....5.75
Plymouth,Mich. P5 ....5.60
So.Chicago,Ill. R2, W14.5.40
Struthers,O. Y1 .....5.40
Warren,O. C17 .....5.40
Waukegan,Ill. A7 .....5.45
Worcester,Mass. A7 ....5.75
Youngstown F3, Y1 ....5.40

RAIL STEEL BARS
ChicagoHts.(3,4) C2 ...4.75
ChicagoHts.(3,4) I-2 ...4.75
Franklin,Pa.(3,4) F5 ...4.75
FortWorth,Tex.(26) T4..4.85
Huntngtn,W.Va.(3) W7..5.50
Marion,O.(3) P11 .....4.75
Moline,Ill.(3) R2 .....3.80
Tonawanda(3,4) B12 ...4.75
Williamsport(3) S19 ....5.00
Williamsport(4) S19 ....5.10

BARS, Wrought Iron
Dover,N.J.(Staybolt)U1 15.00
Dover(Eng.Bolt) U1 ...13.50
Dover(Wrght.Iron) U1. 12.25
Economy,Pa.(S.R.) B14.9.60
Economy,Pa.(D.R.)B14 11.90
Economy(Staybolt) B14 12.20
McK.Rks.(Staybolt)L5 .14.50
McK.Rks.(S.R.) L5 ....9.60
McK.Rks.(D.R.) L5 ...13.00

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ..3.70
Atlanta A11 .....4.25
Buffalo R2 .....3.70
Cleveland R2 .....3.70
Emeryville,Calif. J7 ....4.45
Fairfield,Ala. T2 .....3.70
Fontana,Calif. K1 .....4.40
Gary,Ind. U5 .....3.70
Houston S5 .....4.10
Ind.Harbor,Ind. I-2, Y1.3.70
Johnstown,Pa. B2 .....3.70
KansasCity,Mo. S5 .....4.30
Lackawanna,N.Y. B2 ..3.70
LosAngeles B3 .....4.40
Milton,Pa. B6 .....4.55
Minnequa,Colo. C10 ....4.15
Niles,Calif. P1 .....5.05
Pittsburg,Calif. C11 ....4.40
Pittsburgh J5 .....3.70
Seattle B3, N14 .....4.45
So.Chicago R2, U5, W14.3.70
So.Duquesne,Pa. U5 .....3.70
So.SanFran.,Cal. B3 ....4.45
Struthers,O. Y1 .....3.70
Torrance,Calif. C11 ....4.40
Weirton,W.Va. W6 .....3.85
Youngstown R2, U5 ....3.70

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 .....4.55
BeaverFalls,Pa. M12, R2 4.55
Buffalo B5 .....4.60
Camden,N.J. P13 .....5.00
Carnegie,Pa. C12 .....4.55
Chicago W18 .....4.55
Cleveland A7, C20 .....4.55
Detroit P17 .....4.70
Donora,Pa. A7 .....4.55
Elyria,O. W8 .....4.55
FranklinPark,Ill. N5 ....4.55
Gary,Ind. R2 .....4.55
GreenBay,Wis. R7 .....4.55
Hammond,Ind. L2, M13.4.55
Hartford,Conn. R2 .....5.10
Harvey,Ill. B5 .....4.55
LosAngeles R2 .....6.00
Mansfield,Mass B5 ....5.10
Massillon,O. R2, R8.....4.55
Monaca,Pa. S17 .....4.55
Newark,N.J. W18 .....5.00
Plymouth,Mich. P5 ....4.80
Pittsburgh J5 .....4.55
Putnam,Conn. W18 ....5.10
Readville,Mass. C14 ....5.10
St.Louis,Mo. M5 .....4.95
So.Chicago,Ill. W14 ....4.55
SpringCity.Pa.(5) K3 ...5.00
Struthers,O. Y1 .....4.55
Waukegan,Ill. A7 .....4.55
Youngstown F3, Y1 ....4.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 .....5.40
BeaverFalls,Pa. M12 ....5.40
Bethlehem,Pa. B2 .....5.40
Buffalo B5 .....5.40
Camden,N.J. P13 .....5.80
Canton,O. R2 .....5.40
Canton,O.(29) T7 .....4.90
Carnegie,Pa. C12 .....5.40
Chicago W18 .....5.40
Cleveland A7 .....5.45
Cleveland C20 .....5.40
Detroit P17 .....5.55
Donora,Pa. A7 .....5.45
Elyria,O. W8 .....5.40
Gary,Ind. R2 .....5.40
Hammond,Ind. L2, M13.5.40
Hartford,Conn. R2 .....5.85
Harvey,Ill. B5 .....5.40
Lackawanna,N.Y. B2 ...5.40
Mansfield,Mass B5 .....5.85
Massillon,O. R2, R8 ....5.40
Midland,Pa. C18 .....5.40
Monaca,Pa. S17 .....5.40
Newark,N.J. W18 .....5.75
Plymouth,Mich. P5 ....5.60
So.Chicago,Ill. R2, W14.5.40
Struthers,O. Y1 .....5.40
Warren,O. C17 .....5.40
Waukegan,Ill. A7 .....5.45
Worcester,Mass. A7 ....5.75
Youngstown F3, Y1 ....5.40

RAIL STEEL BARS
ChicagoHts.(3,4) C2 ...4.75
ChicagoHts.(3,4) I-2 ...4.75
Franklin,Pa.(3,4) F5 ...4.75
FortWorth,Tex.(26) T4..4.85
Huntngtn,W.Va.(3) W7..5.50
Marion,O.(3) P11 .....4.75
Moline,Ill.(3) R2 .....3.80
Tonawanda(3,4) B12 ...4.75
Williamsport(3) S19 ....5.00
Williamsport(4) S19 ....5.10

BARS, Wrought Iron
Dover,N.J.(Staybolt)U1 15.00
Dover(Eng.Bolt) U1 ...13.50
Dover(Wrght.Iron) U1. 12.25
Economy,Pa.(S.R.) B14.9.60
Economy,Pa.(D.R.)B14 11.90
Economy(Staybolt) B14 12.20
McK.Rks.(Staybolt)L5 .14.50
McK.Rks.(S.R.) L5 ....9.60
McK.Rks.(D.R.) L5 ...13.00

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ..3.70
Atlanta A11 .....4.25
Buffalo R2 .....3.70
Cleveland R2 .....3.70
Emeryville,Calif. J7 ....4.45
Fairfield,Ala. T2 .....3.70
Fontana,Calif. K1 .....4.40
Gary,Ind. U5 .....3.70
Houston S5 .....4.10
LosAngeles B3 .....4.40
Milton,Pa. B6 .....4.55
Minnequa,Colo. C10 ....4.50
Niles,Calif. P1 .....5.05
Pittsburg,Calif. C11 ....4.40
Pittsburgh J5 .....3.70
Portland,Oreg. O4 .....4.65
Seattle B3, N14 .....4.45
Torrance,Calif. C11 ....4.40
Youngstown R2, U5 ....3.70

BARS, Reinforcing
(Fabricated; to Consumers)
Huntington,W.Va. W7 ..5.50
Johnstown, ¼-1" B2 ....4.75
LosAngeles B3 .....5.45
Marion,O. P11 .....5.00
Seattle B3, N14 .....5.55
So.SanFrancisco B3 ....5.45
SparrowsPt. ¼-1" B2 ...4.75
Williamsport,Pa. S19 ...5.10

SHEETS, Hot-Rolled Steel
(18 gage and heavier)
AlabamaCity,Ala. R2 ..3.60
Ashland,Ky.(8) A10 ....3.60
Butler,Pa. A10 .....3.60
Cleveland J5, R2 .....3.60
Conshohocken,Pa. A3 ..4.00
Detroit M1 .....4.40
Ecorse,Mich.(8) G5 ....3.80
Fairfield,Ala. T2 .....3.60
Fontana,Calif. K1 .....4.55
Gary,Ind. U5 .....3.60
Geneva,Utah C11 .....3.70
GraniteCity, Ill. G4 ....4.30
Ind.Harbor,Ind. I-2, Y1.3.60
Irvin,Pa. U5 .....3.60
Lackawanna,N.Y. B2 ....3.60
Munhall,Pa. U5 .....3.60
Niles,O. N12 .....5.25
Pittsburg,Calif. C11 ....4.30
Pittsburgh J5 .....3.60
Sharon,Pa. S3 .....4.00
So.Chicago,Ill. W14 ....3.60
SparrowsPoint,Md. B2 ..3.60
Steubenville,O. W10 ....3.60
Torrance,Calif. C11 ....4.30
Warren,O. R2 .....3.60
Weirton,W.Va. W6 .....3.60
WestLeechburg,Pa. A4 ..3.75
Youngstown U5, Y1 ....3.60

SHEETS, H.R. (19 gage)
AlabamaCity,Ala. R2 ..4.75
Dover,O. R1 .....5.65
Ind.Harbor,Ind. I-2 ....5.40
Mansfield,O. E6 .....5.65
Niles,O. N12 .....5.75
Torrance,Calif. C11 ....5.40

SHEETS, H.R. (14 ga., heavier)
High-Strength Low-Alloy
Cleveland J5, R2 .....5.40
Conshohocken,Pa. A3 ...5.65
Ecorse,Mich. G5 .....5.95
Fairfield,Ala. T2 .....5.40
Fontana,Calif. K1 .....6.35
Gary,Ind. U5 .....5.40
Ind.Harbor,Ind. I-2 ....5.40
Ind.Harbor,Ind. Y1 ....5.90
Irvin,Pa. U5 .....5.40
Lackawanna(35) B2 ....5.40
Pittsburgh J5 .....5.40
Sharon,Pa. S3 .....5.40
So.Chicago,Ill. U5 .....5.40
SparrowsPoint(36) B2 ..5.40
Warren,O. R2 .....5.40
Weirton,W.Va. W6 .....5.75
Youngstown U5 .....5.40
Youngstown Y1 .....5.90

SHEETS, Cold-Rolled
High-Strength Low-Alloy
Cleveland J5, R2 .....6.65
Ecorse,Mich. G5 .....7.10
Fontana,Calif. K1 .....7.50
Gary,Ind. U5 .....6.55
IndianaHarbor,Ind. Y1 ..7.05
IndianaHarbor,Ind. I-2..6.55
Irvin,Pa. U5 .....6.55
Lackawanna(37) B2 ....6.55
Pittsburgh J5 .....6.55
SparrowsPoint(38) B2 ..6.55
Warren,O. R2 .....6.55
Weirton,W.Va. W6 .....6.90
Youngstown Y1 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10	4.35
Cleveland J5, R2	4.35
Ecorse,Mich. G5	4.55
Fairfield,Ala. T2	4.35
Follansbee,W.Va. F4	5.35
Fontana,Calif. K1	5.30
Gary,Ind. U5	4.35
GraniteCity,Ill. G4	5.05
Ind.Harbor,Ind. I-2, Y1	4.35
Irvin,Pa. U5	4.35
Lackawanna,N.Y. B2	4.35
Middletown,O. A10	4.35
Pittsburg,Calif. C11	5.30
Pittsburgh J5	4.35
SparrowsPoint,Md. B2	4.35
Steubenville,O. W10	4.35
Warren,O. R2	4.35
Weirton,W.Va. W6	4.35
Youngstown Y1	4.35

SHEETS, Galv'd No. 10 Steel

AlabamaCity,Ala. R2	4.80
Ashland,Ky.(8) A10	4.80
Canton,O. R2	4.80
Dover,O. R1	5.50
Fairfield,Ala. T2	4.80
Gary,Ind. U5	4.80
GraniteCity,Ill. G4	5.50
Ind.Harbor,Ind. I-2	4.80
Irvin,Pa. U5	4.80
Kokomo,Ind.(13) C16	5.20
MartinsFerry,O. W10	4.80
Niles,O. N12	6.00
Pittsburg,Calif. C11	5.55
SparrowsPoint,Md. B2	4.80
Steubenville,O. W10	4.80
Torrance,Calif. C11	5.55
Weirton,W.Va. W6	4.80

SHEETS, Galvanized No. 10, High-Strength Low-Alloy

Irvin,Pa. U5	7.20
SparrowsPoint(39) B2	6.75

SHEETS, Galvannealed Steel

Canton,O. R2	5.35
Irvin,Pa. U5	5.35
Kokomo,Ind.(13) C16	5.75
Niles,O. N12	6.55

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	5.05
Middletown,O. A10	5.05

SHEETS, Electro Galvanized

Cleveland R2 (28)	5.65
Niles,O. R2 (28)	5.65
Weirton,W.Va. W6	5.50

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2	5.70

SHEETS, Drum Body

Pittsburg,Calif. C11	4.30
Torrance,Calif. C11	4.30

SHEETS, Well Casing

Fontana,Calif. K1	5.10

BLUED Stock, 29 ga.

Yorkville,O. W10	6.80
Follansbee,W.Va.(23)F4	6.85

SHEETS, Enameling Iron

Ashland,Ky.(8) A10	4.65
Cleveland R2	4.65
Gary,Ind. U5	4.65
GraniteCity,Ill. G4	5.35
Ind.Harbor,Ind. I-2	4.65
Irvin,Pa. U5	4.65
Middletown,O. A10	4.65
Youngstown Y1	4.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$6.25
Fairfield,Ala. T2	6.35
Gary,Ind. U5	6.25
GraniteCity,Ill. G4	6.45
Ind.Harbor,Ind. I-2, Y1	6.25
Irvin,Pa. U5	6.25
Niles,O. R2	6.25
Pittsburg,Calif. C11	7.00
SparrowsPoint,Md. B2	6.35
Warren,O. R2	6.25
Weirton,W.Va. W6	6.25
Yorkville,O. W10	6.25

HOLLOWARE ENAMELING Black Plate (29 gage)

Follansbee,W.Va. F4	5.85
Gary,Ind. U5	5.85
GraniteCity,Ill. G4	6.05
Ind.Harbor,Ind. Y1	5.85
Irvin,Pa. U5	5.85
Yorkville,O. W10	6.15

SHEETS, Culvert No. 16

	Cu Alloy	Cu Fe
Ashland,Ky. A10	5.60	...
Canton,O. R2	5.65	6.10
Fairfield,Ala. T2	5.60	5.85
Gary,Ind. U5	5.60	5.85
IndianaHarbor I-2	5.60	5.85
Irvin,Pa. U5	5.60	5.85
Kokomo,Ind. C16	6.25	...
MartinsFy,O. W10	5.60	5.85
Pittsburg,Cal. C11	6.35	...
SparrowsPt. B2	5.60	...
Torrance,Cal. C11	6.35	...

SHEETS, Culvert, No. 16 Pure Iron

Ashland,Ky. A10	5.85
Fairfield,Ala. T2	5.85

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland,Ky.(8) A10	3.85
Cleveland R2	4.20
Ind.Harbor,Ind. I-2	3.85
Warren,O. R2	4.20

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2	4.95
Middletown,O. A10	4.85
Warren,O. R2	4.95

SHEETS, Galvanized Ingot Iron No. 10 flat

Ashland,Ky.(8) A10	5.05
Canton,O. R2	5.55

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10	5.30
Middletown,O. A10	5.30

SHEETS, ALUMINIZED

Butler,Pa. A10	8.15

TIN PLATE, Electrolytic (Base Box)

	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.15	$7.40	$7.80
Fairfield,Ala. T2	7.25	7.50	7.90
Gary,Ind. U5	7.15	7.40	7.80
GraniteCity,Ill. G4	7.35	7.60	8.00
Ind.Harbor,Ind. I-2, Y1	7.15	7.40	7.80
Irvin,Pa. U5	7.15	7.40	7.80
Niles,O. R2	7.15	7.40	7.80
Pittsburg,Calif. C11	7.90	8.15	8.55
SparrowsPoint,Md. B2	7.25	7.50	7.90
Weirton,W.Va. W6	7.15	7.40	7.80
Yorkville,O. W10	7.15	7.40	7.80

SHEETS, SILICON, H.R. or C.R.(22 Ga.) COILS (Cut Lengths ½c lower)

	Field	Armature	Electric	Motor	Dynamo
BeechBottom W10 (cut lengths)	...	...	7.25	8.50	9.30
Brackenridge,Pa. A4	...	...	7.75	9.00	9.80
GraniteCity,Ill. G4 (cut lengths)	...	...	7.95	9.20	...
Ind.Harbor,Ind. I-2	6.95	7.25	(34)	...	...
Mansfield,O. E6 (cut lengths)	7.10	7.25	7.75	9.00	9.80
Niles,O. N12 (cut lengths)	...	6.75	7.25	...	...
Vandergrift,Pa. U5	...	7.25	7.75	9.00	9.80
Warren,O. R2	6.95	7.25	7.75	9.00	9.80
Zanesville,O. A10	...	7.25	7.75	9.00	9.80

SHEETS, SILICON (22 Ga. Base) Coils (Cut Lengths ½c lower)

Transformer Grade	72	65	58	52
BeechBottom W10 (cut lengths)	9.85	10.40	11.10	11.90
Brackenridge,Pa. A4	10.35	....	....	....
Vandergrift,Pa. U5	10.35	10.90	11.60	12.40
Warren,O. R2	10.35	....	....	....
Zanesville,O. A10	10.35	10.90	11.60	12.40

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)

	T-100	T-90	T-80	T-73
Butler,Pa. A10 (C.R.)	....	....	14.75	15.25
Vandergrift,Pa. U5	12.90	13.75	14.75	15.25

TINPLATE, American Coke (Base Box)

	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.45	$8.70
Fairfield,Ala. T2	8.55	8.80
Gary,Ind. U5	8.45	8.70
Ind.Har. I-2, Y1	8.45	8.70
Irvin,Pa. U5	8.45	8.70
Pitts.,Cal. C11	9.20	9.45
Sp.Pt.,Md. B2	8.55	8.80
Warren,O. R2	8.45	8.70
Weirton,W.Va.W6	8.45	8.70
Yorkville,O. W10	8.45	8.70

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$7.60
Gary,Ind. U5	7.50
Irvin,Pa. U5	7.50
SparrowsPoint,Md. B2	7.60
Yorkville,O. W10	7.50

SHEETS, LT. Coated Ternes, 6 lb

Yorkville,O. W10	$8.40

SHEET, Mfg. Ternes, 8 lb (Commercial Quality)

Gary,Ind. U5	$9.50
Yorkville,O. W10	9.50

SHEET, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va.W10	5.20
Gary,Ind. U5	5.20
Mansfield,O. E6	6.05
Middletown,O. A10	5.20
Niles,O. N12	6.00
Weirton,W.Va. W6	5.20

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.60

ROOFING SHORT TERNES (8 lb Coated)

Gary,Ind. U5	9.50

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2	5.30
Conshohocken,Pa. A3	5.55
Ecorse,Mich. G5	5.95
Fairfield,Ala. T2	5.30
Fontana,Calif. K1	6.20
Gary,Ind. U5	5.30
Ind.Harb.,Ind. I-2	5.30
IndianaHarbor,Ind. Y1	5.80
Lackawanna,N.Y. B2	4.95
LosAngeles(25) B3	6.05
Seattle B3	6.30
Sharon,Pa. S3	5.40
So.SanFrancisco(25) B3	6.05
SparrowsPoint,Md. B2	4.95
Warren,O. R2	5.30
Weirton,W.Va. W6	5.75
Youngstown Y1	5.80
Youngstown U5	5.30

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland J5	6.70
Cleveland A7	6.55
Dover,O. G6	7.30
Fontana,Calif. K1	6.95
Lackawanna,N.Y. B2	6.40
Sharon,Pa. S3	6.55
SparrowsPoint,Md. B2	6.40
Warren,O. R2	6.55
Weirton,W.Va. W6	7.20
Youngstown Y1	7.05

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	3.50
Alton,Ill. L1	3.95
Ashland,Ky.(8) A10	3.50
Atlanta A11	4.05
Bessemer,Ala. T2	3.50
Bridgeprt,Conn.(10) S15	4.00
Buffalo(27) R2	3.50
Butler,Pa. A10	3.50
Carnegie,Pa. S18	4.00
Conshohocken,Pa. A3	3.90
Detroit M1	4.40
Ecorse,Mich. G5	3.80
Fairfield,Ala. T2	3.50
Fontana,Calif. K1	4.75
Gary,Ind. U5	3.50
Houston,Tex. S5	4.90
Ind.Harbor,Ind. I-2, Y1	3.50
Johnstown,Pa.(25) B2	3.50
KansasCity,Mo.(9) S5	4.10
Lackawanna,N.Y.(32)B2	3.50
LosAngeles B3	4.25
Milton,Pa. B6	4.35
Minnequa,Colo. C10	4.55
NewBritain(10) S15	4.00
No.Tonawanda,N.Y. B11	3.50
Pittsburg,Calif. C11	4.25
Riverdale,Ill. A1	3.50
SanFrancisco S7	4.85
Seattle B3, N14	4.50
Sharon,Pa. S3	4.00
So.Chicago,Ill. W14	3.50
So.SanFrancisco B3	4.25
SparrowsPoint,Md. B2	3.50
Torrance,Calif. C11	4.25
Warren,O. R2	3.50
Weirton,W.Va. W6	3.60
WestLeechburg,Pa. A4	3.75
Youngstown U5, Y1	3.50

STRIP, Hot-Rolled Alloy

Bridgeprt,Conn.(10) S15	5.45
Carnegie,Pa. S18	5.85
Fontana,Calif. K1	6.70
Gary,Ind. U5	5.50
Houston,Tex. S5	5.90
KansasCity,Mo. S5	6.10

STRIP, Cold-Finished, Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Berea,O. C7	...	6.80	7.40	9.35	11.65
Bridgeport,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
Bristol,Conn. W1	...	...	7.70	9.65	....
Carnegie,Pa. S18	...	6.80	7.40	9.35	11.65
Cleveland A7	4.65	6.45	7.40	9.35	11.65
Dearborn,Mich. D3	5.60	7.05	7.65	...	....
Detroit D2	5.60	6.65	7.25	...	....
Dover,O. G6	5.50	6.80	7.40	9.35	11.65
FranklinPark,Ill. T6	5.00	6.60	7.55	9.50	11.80
Harrison,N.J. C18	...	...	7.70	9.65	11.95
Mattapan,Mass. T6	5.50	6.75	7.70	9.65	11.95
NewBritn.,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
NewCastle,Pa. B4	5.35	6.80	7.40	9.35	....
NewCastle,Pa. E5	5.50	6.80	7.40	9.35	11.65
NewHaven,Conn. D2	5.85	6.75	7.35	...	....
NewYork W3	...	7.10	7.70	9.65	11.95
Pawtucket,R.I. N8: Cleve.orPitts.Base	...	6.80	7.40	9.35	11.65
Worcester,Mass.,Base	5.85	7.10	7.70	9.65	11.95
Sharon,Pa. S3	5.35	6.80	7.40	9.35	11.65
Trenton,N.J. R5	...	7.10	7.70	9.65	11.95
Wallingford,Conn. W2	5.85	6.75	7.35	9.30	11.60
Weirton,W.Va. W6	5.35	6.80	7.40	9.35	11.65
Worcester,Mass. A7	4.95	6.75	7.70	9.65	11.95
Worcester,Mass. T6	5.50	6.75	7.70	9.65	11.95
Youngstown C8	...	6.80	7.40	9.35	11.65

Spring Steel (Tempered)

Trenton,N.J. R5	...	...	10.30	12.50	15.35
Harrison,N.J. C18	...	...	10.30	12.50	15.35
NewYork W3	...	...	10.30	12.50	15.35
Midland,Pa. C18	5.85				
NewBritn,Conn.(10) S15	5.45				
Sharon,Pa. S3	5.85				
Youngstown U5	5.50				

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G6	5.50
Berea,O. C7	6.60
Bridgeprt,Conn.(10) S15	5.35
Butler,Pa. A10	4.65
Cleveland A7, J5	4.65
Dearborn,Mich. D3	5.60
Detroit D2	5.60
Detroit M1	5.45
Dover,O.(40) G6	5.50
Ecorse,Mich. G5	4.85
Follansbee,W.Va. F4	4.65
Fontana,Calif. K1	6.30
FranklinPark,Ill.(40)T6	4.90
Ind.Harbor,Ind. I-2	4.90
Lackawanna,N.Y. B2	4.65
LosAngeles C1	6.40
Mattapan,Mass. T6	5.50
Middletown,O. A10	4.65
NewBritain(10) S15	5.35
NewCastle,Pa. B4	5.35
NewCastle,Pa.(40) E5	5.25
NewHaven,Conn. D2	5.85
NewHaven,Conn. A7	5.15
Pawtucket,R.I. R3	6.00
Pawtucket,R.I.(21) N8	5.85
Riverdale,Ill.(40) A1	4.90
Rome,N.Y. R6	5.10
Sharon,Pa. S3	5.35
SparrowsPoint,Md. B2	4.65
Trenton,N.J. R5	6.00
Wallingford,Conn. W2	5.85
Warren,O.(40) T5	5.25
Warren,O. R2	4.65
Weirton,W.Va. W6	4.65
Youngstown C8 (40)	5.25
Youngstown Y1	4.65

STRIP, Electro Galvanized

Dover,O. G6	5.50
Warren,O. T5	5.25
Weirton,W.Va. W6	4.65
Youngstown C8	5.25

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Bolardi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B12 Buffalo Steel Co.
B14 A. M. Byers Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Corp.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire

G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div. Borg-Warner Corp.
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

STRIP, Cold-Rolled Alloy Steel

Bridgeprt,Conn.(10)S15	10.75
Carnegie,Pa. S18	10.60
Cleveland A7	10.00
Dover,O. G6	10.50
Fontana,Calif. K1	11.65
Harrison,N.J. C18	10.60
Midland,Pa. C18	10.60
NewBritn,Conn.(10)S15	10.75
Pawtucket,R.I.(11) N8	10.75
Pawtucket,R.I.(12) N8	11.05
Sharon,Pa. S3	10.60
Worcester,Mass. A7	10.30
Youngstown C8	10.60

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	3.75
Warren,O. R2	4.10

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	5.25

TIGHT COOPERAGE HOOP

Atlanta A11	4.05
Riverdale,Ill. A1	3.90
Sharon,Pa. S3	4.15
Youngstown U5	3.75

WIRE, Tire Bead

Bartonville,Ill.(1) K4	10.90
Monessen,Pa. P16	11.40
Roebling,N.J. R5	11.55

WIRE, Merchant Quality

(6 to 8 gage)	An'ld.	Galv.
AlabamaCity R2..	5.70	5.95
Aliquippa J5	5.70	6.15
Atlanta A11	5.95	6.40
Bartonville(19)K4	5.70	6.15
Buffalo W12	4.85	...
Cleveland A7	5.70	6.15
Crawfordsville M8	5.95	6.40
Donora,Pa. A7	5.70	6.15
Duluth,Minn. A7	5.70	6.15
Fairfield T2	5.70	6.15
Houston,Tex. S5..	6.10	6.55
Johnstown B2	5.70	6.15
Joliet,Ill. A7	5.70	6.15
KansasCy,Mo. S5.	6.30	6.75
Kokomo C16	5.80	6.05
LosAngeles B3	6.65	...
Minnequa C10	5.95	6.45
Monessen P7	5.95	6.40
Palmer W12	5.15	...
Pitts.,Calif. C11..	6.65	6.80
Prtsmth.(18)P12	6.10	6.60
Rankin A7	5.70	6.15
So.Chicago R2 ..	5.70	5.95
So.S.Fran. C10 ..	6.65	7.10
SparrowsPt. B2 ..	5.80	6.25
Sterling,Ill.(1)N15	5.70	6.15
Struthers,O. Y1 ..	5.70	6.15
Torrance,Cal. C11	6.65	...
Worcester A7 ...	6.00	6.45

ROPE WIRE

	(A)	(B)
Alton,Ill. L1	8.65	8.90
Bartonville,Ill. K4	8.55	8.80
Buffalo W12	8.55	8.80
Fostoria,O. S1	8.85	9.10
Johnstown,Pa. B2	8.55	8.80
Monessen,Pa. P16	8.55	8.80
Monessen,Pa. P7.	8.80	9.05
Muncie,Ind. I-7	8.75	9.00
Palmer,Mass. W12.	8.85	9.10
Portsmouth,O. P12	8.55	8.80
Roebling,N.J. R5.	8.85	9.10
SparrowsPt. B2 ..	8.65	8.90
Struthers,O. Y1 ..	8.55	8.80
Worcester J4, T6.	8.85	9.10

(A) Plow and Mild Plow.
(B) Improved Plow.

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	4.85
Aliquippa,Pa. J5	4.85
Atlanta A11	5.10
Alton,Ill. L1	5.05
Bartonville,Ill.(1) K4	4.85
Buffalo W12	4.85
Chicago W13	5.10
Cleveland A7, C20	4.85
Crawfordsville,Ind. M8..	5.10
Donora,Pa. A7	4.85
Duluth,Minn. A7	4.85
Fairfield,Ala. T2	4.85
Fostoria,O.(24) S1	5.35
Houston S5	5.25
Johnstown,Pa. B2	4.85
Joliet,Ill. A7	4.85
KansasCity,Mo. S5	5.45
Kokomo,Ind. C16	4.95
LosAngeles B3	5.80
Minnequa,Colo. C10	5.10
Monessen,Pa. P7	5.10
Newark 6-8 ga. I-1	5.50
No.Tonawanda B11	4.85
Palmer,Mass. W12	5.15
Pittsburg,Calif. C11	5.80
Portsmouth,O. P12	5.25
Rankin,Pa. A7	4.85
So.Chicago,Ill. R2	4.85
So.SanFrancisco C10	5.80
SparrowsPoint,Md. B2	4.95
Sterling,Ill.(1) N15	4.85
Struthers,O. Y1	4.85
Torrance,Calif. C11	5.80
Waukegan,Ill. A7	4.85
Worcester,Mass. A7, T6.	5.15

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	6.20
Buffalo W12	6.35
Cleveland A7	5.85
Crawfordsville,Ind. M8..	6.20
Detroit D2	6.20
Dover,O. G6	6.20
Fostoria,O. S1	6.00
Kokomo,Ind. C16	5.70
FranklinPark,Ill. T6	6.20
Massillon,O. R8	5.85
Monessen,Pa. P16	5.85
Monessen,Pa. P7	6.10
NewHaven,Conn. D2	6.50
Pawtucket,R.I.(12) N8..	6.85
Trenton,N.J. R5	6.15
Worcester,Mass. A7	6.15
Worcester,Mass. T6	6.50
Worcester,Mass. W12	6.65

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4	8.50
Monessen,Pa. P16	8.50
Muncie,Ind. I-7	8.70
Roebling,N.J. R5	8.80
SparrowsPoint,Md. B2	8.60
Johnstown,Pa. B2	8.50

WIRE (16 gage)	Ani'd. Stone	Galv. Stone
Aliquippa J5	10.15	12.15
Bartonville(1)K4	10.25	11.95
Cleveland A7	10.25	12.15
Crawfrdsville M8	10.30	12.00
Fostoria,O. S1	10.40	13.00
Johnstown B2	10.25	12.15
Kokomo C16	10.25	11.95
Minnequa C10	10.40	12.40
Palmer,Mass. W12	10.25	12.15
Pitts.Cal. C11	10.60	12.50
Prtsmth.(18) P12	10.55	12.30
SparrowsPt. B2	10.35	12.25
Waukegan A7	10.25	12.15

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	6.25
Alton,Ill. L1	6.45
Bartonville,Ill.(1) K4	6.25
Buffalo W12	6.25
Cleveland A7	6.25
Donora,Pa. A7	6.25
Duluth,Minn. A7	6.25
Fostoria,O. S1	6.25
Johnstown,Pa. B2	6.25
LosAngeles B3	7.20
Millbury,Mass.(12) N6	8.05
Monessen,Pa. P7, P16	6.25
Muncie,Ind. I-7	6.45
Palmer,Mass. W12	6.55
Pittsburg,Calif. C11	7.20
Roebling,N.J. R5	6.55
Portsmouth,O. P12	6.25
So.Chicago,Ill. R2	6.25
So.SanFrancisco C10	7.20
SparrowsPoint,Md. B2	6.35
Struthers,O. Y1	6.25
Trenton,N.J. A7	6.55
Waukegan,Ill. A7	6.25
Worcester A7, T6, W12.	6.55
Worcester,Mass. J4	6.75

WIRE, Fine & Weaving (8"Coils)

Bartonville,Ill.(1) K4	8.90
Buffalo W12	8.90
Chicago W13	8.90
Cleveland A7	8.90
Crawfordsville,Ind. M8	8.95
Fostoria,O. S1	8.90
Johnstown,Pa. B2	8.90
Kokomo,Ind. C16	8.90
Monessen,Pa. P16	8.90
Muncie,Ind. I-7	9.10
Palmer,Mass. W12	9.20
Portsmouth,O. P12	8.90
Roebling,N.J. R5	9.20
Waukegan,Ill. A7	8.90
Worcester,Mass. A7, T6.	9.20

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	137
Aliquippa,Pa. J5	141
Atlanta A11	144
Bartonville,Ill.(19) K4	144
Crawfordsville,Ind. M8	146
Donora,Pa. A7	141
Duluth,Minn. A7	141
Fairfield,Ala. T2	141
Houston,Tex. S5	149
Johnstown,Pa B2	141
Joliet,Ill. A7	141
KansasCity,Mo. S5	153
Kokomo,Ind. C16	143
Minnequa,Colo. C10	147
Monessen,Pa. P7	146
Pittsburg,Calif. C11	161
Portsmouth,O.(18) P12	148
Rankin,Pa. A7	141
So.Chicago,Ill. R2	137
So.SanFran.,Calif. C10	161
SparrowsPoint,Md. B2	143
Sterling,Ill.(1) N15	141

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	123
Atlanta A11	126
Bartonville,Ill.(19) K4	123
Crawfordsville,Ind. M8	132
Donora,Pa. A7	123
Duluth,Minn. A7	123
Fairfield,Ala. T2	123
Joliet,Ill. A7	123
KansasCity,Mo. S5	135
Kokomo,Ind. C16	125
Minnequa,Colo. C10	128
Pittsburg,Calif. C11	147
So.Chicago,Ill. R2	123
So.SanFran.,Calif. C10	147
SparrowsPoint,Md. B2	125
Sterling,Ill.(1) N15	123

WIRE, Upholstery Spring

Aliquippa,Pa. J5	5.90
Alton,Ill. L1	6.10
Buffalo W12	5.90
Cleveland A7	5.90
Donora,Pa. A7	5.90
Duluth,Minn. A7	5.90
Johnstown,Pa. B2	5.90
LosAngeles B3	6.85
Monessen,Pa. P7, P16	5.90
NewHaven,Conn. A7	6.20
Palmer,Mass. W12	6.20
Pittsburg,Calif. C11	6.85
Portsmouth,O. P12	5.90
Roebling,N.J. R5	6.20
So.Chicago,Ill. R2	5.90
So.SanFrancisco C10	6.85
SparrowsPoint,Md. B2	6.00
Torrance,Calif. C11	6.85
Trenton,N.J. A7	6.20
Waukegan,Ill. A7	5.90
Worcester,Mass. A7	6.20

WOVEN FENCE, 9-15½Ga.

	Col.
AlabamaCity,Ala. R2	127
Ala.City,Ala.,17-18ga. R2	214
Aliquippa,Pa.9-14½ga.J5	131
Atlanta A11	134
Bartonville,Ill.(19) K4	131
Crawfordsville,Ind. M8	133
Donora,Pa. A7	131
Duluth,Minn. A7	131
Fairfield,Ala. T2	131
Houston,Tex. S5	139
Johnstown,Pa. B2	131
Johnstown,17ga.,6" B2	205
Johnstown,17ga.,4" B2	208
Joliet,Ill. A7	131
KansasCity,Mo. S5	143
Kokomo,Ind. C16	133
Minnequa,Colo. C10	139
Monessen,Pa. P7	136
Pittsburg,Calif. C11	154
Portsmouth,O.(18) P12	138
Rankin,Pa. A7	131
So.Chicago,Ill. R2	127
Sterling,Ill.(1) N15	131

FENCE POSTS

ChicagoHts.,Ill. C2	140
Duluth,Minn. A7	125
Franklin,Pa. F5	140
Huntington,W.Va. W7	140
Johnstown,Pa. B2	140
Marion,O. P11	140
Minnequa,Colo. C10	130
Moline,Ill. R2	136
So.Chicago,Ill. R2	140
Tonawanda,N.Y. B12	140
Williamsport,Pa. S19	150

TRACK BOLTS (20) Treated

KansasCity,Mo. S5	9.85
Lebanon,Pa.(31) B2	9.85
Minnequa,Colo. C10	9.85
Pittsburgh O3, P14	9.85
Seattle B3	10.35

NAILS & STAPLES, Stock
To dealers & mfrs. (7) Col.

AlabamaCity,Ala. R2	118
Aliquippa,Pa.(13) J5	118
Atlanta A11	121
Bartonville,Ill.(19) K4	118
Chicago,Ill. W13	118
Cleveland A9	125
Crawfordsville,Ind. M8	122
Donora,Pa. A7	118
Duluth,Minn. A7	118
Fairfield,Ala. T2	118
Galveston,Tex. D7	126
Houston,Tex. S5	126
Johnstown,Pa. B2	118
Joliet,Ill. A7	118
KansasCity,Mo. S5	130
Kokomo,Ind. C16	120
Minnequa,Colo. C10	123
Monessen,Pa. P7	124
Pittsburg,Calif. C11	137
Portsmouth,O. P12	124
Rankin,Pa. A7	118
So.Chicago,Ill. R2	118
SparrowsPoint,Md. B2	120
Sterling,Ill.(1) N15	118
Torrance,Calif. C11	138
Worcester,Mass. A7	124

NAILS, Cut (100 lb keg)
To dealers (33)

Conshohocken,Pa. A3	$7.35
Wheeling,W.Va. W10	7.35

TIE PLATES

Fairfield,Ala. T2	4.50
Gary,Ind. U5	4.50
Ind.Harbor,Ind. I-2	4.50
Lackawanna,N.Y. B2	4.50
Minnequa,Colo. C10	4.50
Pittsburg,Calif. C11	4.65
Seattle B3	4.65
Steelton,Pa. B2	4.50
Torrance,Calif. C11	4.65

JOINT BARS

Bessemer,Pa. U5	4.70
Fairfield,Ala. T2	4.70
Ind.Harbor,Ind. I-2	4.70
Joliet,Ill. U5	4.70
Lackawanna,N.Y. B2	4.70
Minnequa,Colo. C10	4.70
Steelton,Pa. B2	4.70

STANDARD TRACK SPIKES

Ind.Harbor,Ind. I-2, Y1.	6.15
KansasCity,Mo. S5	6.40
Lebanon,Pa. B2	6.15
Minnequa,Colo. C10	6.15
Pittsburgh J5	6.15
Seattle B3	6.65
So.Chicago,Ill. R2	6.15
Struthers,O. Y1	6.15
Youngstown R2	6.15

AXLES

Ind.Harbor,Ind. S13	5.60
Johnstown,Pa. B2	5.60

RAILS	Std. No. 1	Std. No. 2	Std. Tee Rails All No. 2	60 lb Under
Bessemer,Pa. U5	3.60	3.50	3.55	4.00
Ensley,Ala. T2	3.60	3.50	...	4.00
Fairfield,Ala. T2	...	...	...	4.00
Gary,Ind. U5	3.60	3.50	3.55	...
Huntington,W.Va. W7	...	...	...	5.00
Ind.Harbor,Ind. I-2	3.60	3.50	3.55	...
Johnstown,Pa. B2	...	...	...(16)	4.00
Lackawanna,N.Y. B2	3.60	3.50	...	4.00
Minnequa,Colo. C10	3.60	3.50	...	4.50
Steelton,Pa. B2	3.60	3.50	...	...
Williamsport,Pa. S19	...	...	...	4.75

TOOL STEEL

Grade	$ per lb
Regular Carbon	0.230
Extra Carbon	0.270
Special Carbon	0.325
Oil Hardening	0.350
5% Cr Hot Work	0.350
Hi-Carbon-Cr	0.635

Grade by Analysis

W	Cr	V	Co	
18	4	1	....	1.505
18	4	2	....	1.650
20.25	4.25	1.6	12.25	3.535-3.675
19	4	2	7	2.460
18.25	4.25	1	4.75	2.125
18	4	2	9	2.445-2.45
13.5	4	3	....	1.6025

W	Cr	V	Mo	
6.4	4.5	19.5	5	0.96-0.965
6	4	3	6	1.190
1.5	4	1	8.5	0.810

Tool steel products include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2 and V3.

Footnotes:
(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) Philadelphia del.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.50c for 17 Ga. & heavier.
(14) Also wide flange beams.
(15) ½" and thinner.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pitts. base
(20) 0.25c off for untreated.
(21) New Haven, Conn., base.
(22) Del. San Francisco Bay area.
(23) 28 Ga. 36" wide.
(24) Deduct 0.20c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing, mill lengths, to fabricators; to consumers, 5.60c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Subject to 10% increase.
(30) Sheared: add 0.35c for universal mill.
(31) Not annealed.
(32) Rd. or square edge.
(33) To jobbers, deduct 20c.
(34) 7.35c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 15 gage & lighter: 60" & narrower.
(38) 14 gage & lighter: 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035": 0.035" and heavier, 0.25c higher.

Key to Producers

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M9 Midvale Co.
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.

N2 National Supply Co.
N3 National Tube Div.
N5 Nelsen Steel & Wire Co.
N6 NewEng-HighCarb.Wire
N8 Newman-Crosby Steel
N12 Niles Rolling Mill Div.
N14 Nrthwst. Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P9 Pittsburgh Tube Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.
S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sloss-Sheffield S.&I. Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S24 Seidelhuber Steel
T2 Tenn. Coal & Iron Div.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
U1 Ulster Iron Works
U4 Universal Cyclops Steel
U5 United States Steel Co.
V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.
W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div. International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
Y1 Youngstown Sheet&Tube

They cancelled their order . . . . and we liked it!

ONE of our good customers ordered a 1500 lb. CECO-DROP, and shortly thereafter cancelled the order.

We don't like cancellations any better than anyone else, but this one we *did* like . . . after we learned the reason for it: In re-assessing their forge shop requirements, they decided they needed, not one 1500 lb., but two 3000 lb. Ceco-Drops, with an eventual goal of a 100% Ceco-Drop Shop

The trend is definitely toward Ceco-Drops

QUOTATION:

"I would give a good deal if I had all of our board drop hammers out of the shop and nothing but Ceco-Drops in."

Write for a copy of Bulletin 11-L-O and learn more about this modern hammer.

CHAMBERSBURG ENGINEERING COMPANY
Chambersburg Pennsylvania

CHAMBERSBURG

THE HAMMER BUILDERS

STANDARD PIPE, T & C

BUTTWELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % —Black— A	B	C	—Galvanized— D	E	F
⅛	5.5c	0.24	34.0	32.0	...	+0.5	+2.5	...
¼	6.0	0.42	28.5	26.5	...	+3.5	+5.5	...
⅜	6.0	0.57	23.5	21.5	...	+10.0	+12.5	...
½	8.5	0.85	36.0	34.0	35.0	12.0	10.0	11.0
¾	11.5	1.18	39.0	37.0	38.0	16.0	14.0	15.0
1	17.0	1.68	41.5	39.5	40.5	19.5	17.5	18.5
1¼	23.0	2.28	42.0	40.0	41.0	20.5	18.5	19.5
1½	27.5	2.78	42.5	40.5	41.5	21.5	19.5	20.5
2	37	3.68	43.0	41.0	42.0	22.0	20.0	21.0
2½	58.5	5.82	43.5	41.5	42.5	23.0	21.0	22.0
3	76.5	7.62	43.5	41.5	42.5	23.0	21.0	22.0

Column A: Etna, Pa N2 and 36½ % on 3½", 4"; Butler, Pa. ⅛-⅜", F6; Benwood, W. Va., 3½ points lower on ⅛", 1½ points lower on ¼", and 2 points lower on ⅜", W10; Sharon, Pa. M6, 1 point higher on ⅛", 2 points lower on ¼" and ⅜"; Wheatland, Pa. W9, 2 points lower on ⅛", ¼", ⅜". Following make ½" and larger: Lorain, O. N3; Youngstown R2 and 36¼ % on 3½" and 4"; Youngstown Y1; Aliquippa, Pa. J5; Fontana, Calif. K1 quotes 11½ points lower on ½" and larger continuous weld and 24% on 3½" and 4".

Columns B & E: Sparrows Point, Md. B2.

Columns C & F: Indiana Harbor, Ind., Y1; Alton, Ill., (Gary base) 2 points lower discount L1.

Column D: Butler, Pa. F6, ⅛-⅜"; Benwood, W. Va. W10, except plus 4% on ⅛", plus 6% on ¼", plus 13% on ⅜" and 15.5% on 3½", 4"; Sharon, Pa. M6, plus 2.5 on ⅛", 1 point lower on ½", ¾", 1½ points lower on 1" and 1¼", 2 points lower on 1½", 2", 2½" and 3"; Wheatland, Pa. W9, add 2 points on ⅛", ¼", ⅜", 1 point lower on ¾", 2 points lower on 1", 1½", 2", 1½ points lower on 1¼", 2½", 3". Etna, Pa. N2 and 15.5% on 3½", 4". Following quote only on ½" and larger: Lorain, O. N3; Youngstown R2, and 15½ % on 3½" and 4"; Youngstown Y1, Aliquippa, Pa. J5 quotes 1 point lower on ¾", 2 points lower on 1", 1½", 2", 1½ points lower on 1¼", 2½" and 3".

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Galv. B	Elec. Weld Black C	Galv. D
2	37.0c	3.68	29.5	8.0	29.5	8.0
2½	58.5	5.82	32.5	11.5	32.5	11.5
3	76.5	7.62	32.5	11.5	32.5	11.5
3½	92.0	9.20	34.5	13.5	34.5	13.5
4	$1.09	10.89	34.5	13.5	34.5	13.5
5	1.48	14.81	37.0	16.0	37.0	16.0
6	1.92	19.18	37.0	16.0	37.0	16.0

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5 quotes 1½ pts lower on 2", 1 pt lower on 2½-6-in.; Lorain N3; Youngstown Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft., mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Ga.	—Seamless— H.R.	C.D.	Elec. Weld H.R.	C.D.
1	13	13.45	16.47	15.36	15.36
1¼	13	16.09	19.71	15.61	18.19
1½	13	17.27	21.15	17.25	20.30
1¾	13	19.29	23.62	19.62	23.09
2	13	21.62	26.48	21.99	25.86
2¼	13	24.35	29.82	24.50	28.84
2¼	12	26.92	32.97	26.98	31.76
2½	12	29.65	36.32	29.57	34.76
2¾	12	32.11	39.33	31.33	36.84
3	12	34.00	41.64	32.89	38.70

CLAD STEELS

(Cents per pound)

Cladding Stainless	Plates 10%	Plates Carbon Base 20%	Strip Cold-Rolled Carbon Base 10%	Strip Cold-Rolled Carbon Base Both Sides	Sheets Carbon Base 10%	Sheets Carbon Base 20%	Sheets Cu Base Both Sides
302 ...	....	....	....	....	19.75	26.24–27.50	77.00
304 ...	25.00	29.50	....	....	24.50	27.50–27.77	77.00
309 ...	30.50	35.00	....	....	....	....	....
310 ...	36.50	41.00	....	....	....	....	144.00
316 ...	29.50	34.00	....	....	26.00	35.92–36.50	....
317 ...	34.50	39.00	....	....	....	....	....
318 ...	33.50	38.00	....	....	....	....	....
321 ...	26.50	31.00–32.00	....	....	23.00	33.00	111.00
347 ...	27.50	32.00	....	....	24.00	33.50–33.83	130.00
405 ...	21.25	27.75	....	....	....	....	....
410 ...	20.75	27.25	....	....	....	....	....
Nickel .	33.55	45.15	41.00	54.00	....	....	....
Inconel.	41.23	54.18	....	....	....	....	165.00
Monel .	34.93	46.28	....	....	....	....	....
Copper*	....	....	23.70†	29.65‡	....	....	....

* Deoxidized. † 20.20c for hot-rolled. ‡ 26.40c for hot-rolled. Production points for carbon base products: Stainless plates, sheet, Conshohocken, Pa. A3 and New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; nickel, copper-clad strip, Carnegie, Pa., S18. Production point for copper-base sheets is Carnegie, Pa. A13.

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants; per cent off list for less than case lots to consumers

6 in. and shorter:

½-in. & smaller diam. 15
⅝-in. & ⅝-in. 18.5
⅞-in. and larger ... 17.5

Longer than 6 in.:

All diams. 14

Lag bolts, all diams.:

6 in. and shorter ... 23
over 6 in. long 21

Ribbed Necked Carriage 18.5
Blank 34
Plow 34
Step, Elevator, Tap and Sleigh Shoe 21
Tire bolts 21
Boiler & Fitting-Up Bolts 31

NUTS

H.P. & C.P. Square:	Reg.	Hvy.
½-in. & smaller	15	15
⅝-in. & ⅝-in. .	12	6.5
¾-in.-1½-in. ..	9	1
1⅝-in. & larger	7.5	1
H.P. Hex.:		
½-in. & smaller	26	22
⅝-in. & ⅝-in. .	16.5	6.5
¾-in.-1½-in. ..	12	2
1⅝-in. & larger	8.5	2
C. P. Hex.:		
½-in. & smaller	26	22
⅝-in. & ⅝-in. .	23	17.5
¾-in. & 1½-in.	19.5	12
1⅝-in. & larger	12	6.5

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or keg quantities)

	Reg.	Hvy.
½-in. & smaller..	35	28.5
⅝-in. & ⅝-in. ..	29.5	22
¾-in.-1½-in.	24	15
1⅝-in. & larger..	13	8.5
		Light
⅞-in. & smaller		35
½-in. to ⅝-in.		28.5
¾-in. to 1½-in.		26

STEEL STOVE BOLTS

(F.o.b. plant, per cent off list in packages)

Plain finish .....48 & 10
Plated finishes .....31 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged: per cent off list)

6 in. or shorter:

⅝-in. & smaller 42
¾-in. through 1 in. . 34

Longer than 6 in.:

⅝-in. & smaller 26
¾-in. through 1 in. . 4

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam x 6 in. and shorter 38
1 in. and smaller diam. x over 6 in. 26

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller ... 35
¼-in. diam. & larger .. 16
N.F. thread, all diams. 10

RIVETS

F.o.b. midwestern plants

Structural ½-in., larger 7.85c
½-in. under ..... 36 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers—List to list-plus-$1

FLUORSPAR

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 70%, $43; 60%, $40.

Imported, net ton, duty paid, metallurgical grade, $33-$35.

ELECTRODES

(Threaded, with nipples, unboxed f.o.b. plant)

GRAPHITE

Inches Diam.	Length	Cents per lb
17,18,20	60,72	17.85
8 to 16	48,60,72	17.85
7	48,60	19.57
6	48,60	20.95

CARBON

35,40	110	8.03
30	65,84,110	8.03
24	72 to 104	8.03
17 to 20	34,90	8.03

STAINLESS STEEL

Type	Sheets	C.R. Strip	Bars Wire Structurals
301...	41.00	34.00	31.25
302...	41.25	36.75	31.50
303...	43.25	40.25	34.00
304...	43.25	38.75	33.00
309...	56.00	55.00	44.75
316...	57.00	59.00	49.25
321...	49.25	48.25	37.00
347...	53.75	52.25	41.50
410...	36.50	30.50	25.75
416...	37.00	37.00	26.25
420...	44.00	47.00	31.25
430...	39.00	31.00	26.25
501...	27.50	26.00	14.25
502...	28.50	27.00	15.25

Balt., Types 301-347 sheet, except 303 and 309 E2.

Brackenridge, Pa., sheets A4 quotes slight variations on Types 301-347.

Bridgeville, Pa., bars, wire, sheets & strip U4.

Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502, A10.

Carnegie, Pa., sheets and strip except Types 303, 416, 501 & 502 S18.

Cleveland, strip A7.

Detroit, strip M1 quotes 34.00c on Type 301; 36.50c, 302; 38.50c, 304; 58.50c, 316; 52.00c, 347; 30.50c, 410; 31.00c, 430.

Dunkirk, N. Y., bars, wire A4 quotes slight variations on Types 301-347.

Duquesne, Pa., bars U5.

Fort Wayne, Ind., bars and wire, except Types 501 & 502 J6 quotes slight variations on Types 301-347.

Gary, Ind., sheets except Type 416 U5.

Harrison, N. J., strip and wire C18.

Massillon, O., all items, R2.

McKeesport, Pa., strip, Type 410; bars & wire, Types 410 through 430 and 31.25c on Type 302, 33.75c on 303, 32.75c on 304, 48.75c on 316, 36.75c on 321, 41.25c on 347 F2.

McKeesport, Pa., bars, sheets except Type 416 U5.

Middletown, O., sheets and strip except Types 303, 416, 420, 501 and 502 A10.

Midland, sheets & strip C18.

Munhall, Pa., bars U5.

Muncie, Ind., wire I-7 quotes types 302, 304, 430.

Pittsburgh, sheets C15.

Reading, Pa., strip except 34.25c on Type 301 and 56.00c on 309; bars, except 31.50c on Type 301 and 45.25c on 309 C4.

Sharon, Pa., strip, except Types 303, 309, 416, 501, 502 and 34.25c on Type 301 S3.

So. Chicago, Ill., bars & structurals U5.

Syracuse, N. Y., bars, wire & structurals C18.

Titusville, Pa., bars U4.

Wallingford, Conn., strip W2 quotes 0.25c higher.

Washington, Pa., bars, sheets & strip, except 0.25c higher on Type 301 J3.

Washington, Pa., Types 301 through 347 sheets & strip except 303, 309; 316 sheets 62.00c, strip 64.00c W4

Watervliet, N. Y., structurals & bars A4 quotes variations on Types 301-347.

Waukegan, bars & wire A7.

West Leechburg, Pa., strip, A4 quotes slight variations on Types 301-347.

Youngstown, strip except Types 303, 309, 316, 416, 501 and 502 and 34.25c on Type 301 C8.

COAL CHEMICALS

Spot, cents per gallon, ovens

Pure benzol 30.00-35.00
Toluol, one deg...26.00-33.00
Industrial xyiol ..25.00-33.50

Per ton bulk ovens

Sulphate of ammonia..$32-$45

Cents per pound, ovens

Phenol, 40 (carlots, non-returnable drums) ...17.25

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted.)

Sponge iron: Cents
98+% Fe, annealed. 18.00
Unannealed 14.50
Swedish, c.i.f. New York, in bags..8.85-9.95

Electrolytic iron:
Annealed, 99.5% Fe. 42.50
Unannealed (99 + % Fe) 36.50
Unannealed, 99 + % Fe (minus 325 mesh) 53.50

Powder Flakes 48.50

Carbonyl Iron:
97.9-99.8% size 5 to 10 microns ..83.00-148.00

Aluminum:
Carlots, freight allowed 29.50
Atomized, 500 lb drums, freight allowed 32.50

Antimony, 500 lb lots . 71.00

Brass, 20-ton lots..28.25-32.00

Bronze, 10-ton lots 51.25-60.00

Phosphor-Copper, 20-ton lots 50.00

Copper:
Electrolytic 37.25
Reduced 34.75

Lead 22.50

Magnesium 75.00-85.00

Manganese:
Minus 100 mesh 57.00
Minus 35 mesh 52.00
Minus 200 mesh 62.00

Nickel unannealed 86.00

Nickel-Silver 5-ton lots 44.50

Silicon 38.50

Solder (plus cost of metal) 8.50

Stainless Steel, 302 ... 83.00

Zinc, 10-ton lots..20.00-28.00

Tungsten Dollars

Melting grade, 99% 60 to 200 mesh:
1000 lb and over ... 5.85
Less than 1000 lb .. 6.00

Molybdenum:
99.9%, minus 200 mesh 3.24

Chromium, electrolytic 99% Cr min. 3.50

METALLURGICAL COKE

Price net ton

BEEHIVE OVENS

Connellsvil.fur. .$14.50-15.00
Connellsvil.fdy. ..16.50-17.50
New River foundry ... 21.30
Wise county, foundry.. 15.95
Wise county, furnace.. 15.20

OVEN FOUNDRY COKE

Kearney, N. J. ovens.$22.75
Everett, Mass., ovens New England, del. ..*24.80
Chicago ovens 23.00
Chicago, del. 24.50
Terre Haute, ovens ... 22.50
Milwaukee, ovens 23.75
Indianapolis, ovens ... 22.75
Chicago, del. 26.62
Cincinnati, del. 25.85
Detroit, del. 27.05
Ironton, O., ovens 22.50
Cincinnati, del. 25.12
Painesville, O., ovens. 24.00
Cleveland, del. 25.82
Erie, Pa., ovens 23.50
Birmingham, ovens 20.30
Cincinnati, del. 25.23
Philadelphia, ovens ... 22.70
NevilleIsland,Pa.,ovens 23.00
Swedeland, Pa., ovens. 22.60
St. Louis, ovens
St. Louis, del. 25.40
Portsmouth, O., ovens 22.50
Cincinnati, del. 25.12
Detroit, ovens 24.00
Detroit, del. 25.00
Buffalo, del. 26.58
Flint, del. 26.73
Pontiac, del. 25.56
Saginaw, del. 27.08

*Or within $4.55 freight zone from works.

Let's Get in ALL the SCRAP

If you are not equipped to bale your sheet metal scrap, there are TWO WAYS you can help to assure an adequate supply of scrap metal *now* and in the years ahead:

1. FOR THE PRESENT . . .

Make arrangements with a responsible Scrap Metal Dealer who is equipped to bale your Sheet Metal Scrap and ship it to Mills, Smelters and Foundries for the *Immediate* Needs of Military and Civilian Production.

2. FOR THE FUTURE . . .

Plan *now* to *integrate your plant for the orderly*, economical and profitable reclamation of your sheet metal scrap. This can be accomplished by building your Scrap Salvaging Program around the right type and size of baling equipment.

Galland-Henning offers you *competent counsel* on your Scrap Metal Baling Operations based on many years experience in the design, construction and installation of Scrap Metal Baling Presses for every industrial need.

GALLAND-HENNING MFG. CO.
2747 South 31st Street • Milwaukee 46, Wisconsin

GALLAND-HENNING
SCRAP METAL BALING PRESSES

A 7126-1P

WAREHOUSE STEEL PRODUCTS

(Representative prices, cents per pound, for delivery within switching limits, subject to extras.)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R.	Gal. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140‡§		Carbon	Floor
New York (city)	6.28	7.24	8.42	6.50	...	6.52	7.33	9.29	6.38	6.76	8.01
JerseyCty(c'try)	6.09	6.94	8.12	6.36	...	6.22	7.03	8.99	6.08	6.46	7.71
Boston (city) ..	6.45	7.23	8.44	6.40	...	6.30	6.82	10.80	6.45	6.65	7.89
Boston (c'try)..	6.25	7.03	8.24	6.20	...	6.10	6.61	10.60	6.25	6.45	7.69
Phila. (city) ...	6.09	7.05	8.25	6.29	7.19	6.35	7.19	10.50	6.11	6.38	7.33
Phila. (c'try) ..	5.84	6.80	8.00	6.04	6.94	6.10	6.94	10.25	5.86	6.13	7.08
Balt. (city) ...	5.74	7.04	8.27	6.27	...	6.25	6.87	...	6.37	6.33	7.61
Balt. (c'try) ..	5.54	6.84	8.07	6.07	...	6.05	6.67	...	6.17	6.13	7.41
Norfolk, Va. ...	6.78	...	...	...	...	6.04	7.30	...	6.30	6.30	7.15
Richmond, Va. .	5.74	6.57	8.38	6.14	...	5.91	6.59	...	6.72	6.86	8.00
Wash. (w'hse) .	6.05	7.26	8.49	6.50	...	6.50	7.26	...	6.60	6.65	7.86
Buffalo (del.)..	5.74	6.52	8.31	6.06	...	5.72	6.65	10.72††	6.02	6.18	7.55
Buffalo (w'hse).	5.54	6.32	8.11	5.86	...	5.52	6.45	10.52††	5.82	5.98	7.35
Pitts. (w'hse)..	5.54	6.32	7.70	5.59	6.90	5.47	6.15	10.10††	5.65	5.65	6.89
Detroit (w'hse).	5.74	6.49	8.34	5.78	7.15	5.76	6.60	10.37††	6.12	6.17	7.23
Cleveland (del.)	5.74	6.52	8.01	5.85	7.14	5.81	6.35	10.41††	6.15	6.02	7.39
Cleve. (w'hse) .	5.54	6.32	7.81	5.65	6.94	5.61	6.15	10.21††	5.95	5.82	7.19
Cincin. (w'hse).	5.87	6.39	8.17	5.79	...	5.77	6.66	10.52††	6.12	6.17	7.31
Chicago (city)..	5.74	6.52	7.90	5.69	...	5.67	6.25	10.30††	5.85	5.85	7.09
Chicago (w'hse)	5.54	6.32	7.70	5.49	...	5.47	6.05	10.10††	5.65	5.65	6.89
Milwau. (city) .	5.90	6.68	8.06	5.85	...	5.83	6.51	10.37††	6.01	6.01	7.25
Milwau. (c'try).	5.70	6.48	7.86	5.65	...	5.63	6.31	10.17††	5.81	5.81	7.05
St. Louis (del.)	6.04	6.80	8.20	5.99	...	5.97	6.65	10.60††	6.25	6.25	7.49
St. L. (w'hse) .	5.84	6.60	8.00	5.79	...	5.77	6.45	10.40††	6.05	6.05	7.29
Kans. City(city)	6.40	7.20	8.40	6.35	...	6.35	7.20	...	6.50	6.60	7.80
Kans.Cty(w'hse)	6.20	7.00	8.20	6.15	...	6.15	7.00	...	6.30	6.40	7.60
Birm'hm (city).	5.75	6.55	6.90[2]	5.70	...	5.70	7.53	...	5.85	6.10	8.23
Birm'hm(w'hse)	5.60	6.40	6.75[2]	5.55	...	5.55	7.53	...	5.70	5.95	8.23
Los Ang. (city).	6.50	8.30[3]	9.50	6.60	10.65	6.45	8.05	11.50††	6.50	6.50	8.75
L. A. (w'hse)..	6.30	8.10[3]	9.30	6.40	10.45	6.25	7.85	11.30††	6.30	6.30	8.55
Seattle-Tacoma.	7.01	7.84	9.50	7.45	...	6.70	8.89	10.35	6.52	6.86	8.73
SanFran.(w'hse)	6.64	7.88[3]	9.10[3]	6.42	...	6.32	8.20	11.30	6.30	6.43	8.50

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); ‡ includes extra for 10 gage; § as rolled; ** 16 gage; †† as annealed; §§ 15 gage. Base quantities, 2000 to 9999 lb except as noted. Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; [2]—500 to 1499 lb; [3]—450 to 1499 lb; [4]—3500 lb and over; [5]—1000 to 1999 lb.

Ores

Lake Superior Iron Ore
(1951 contract prices; 1952 prices not established)

Gross ton, 51½% (natural), lower lake ports.

After adjustment for analysis, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in applicable lake vessel rates, upper lake rail, freights, dock handling charges and taxes thereon.

Old range bessemer	$8.70
Old range nonbessemer	8.55
Mesabi bessemer	8.45
Mesabi nonbessemer	8.30
High phosphorus	8.30

Eastern Local Ore
Cents per unit del., E. Pa.

Foundry and basic 56-62% concentrates contract	17.00

Foreign Ore
Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	nom.
Long-term contract	20.00-24.00
North African hematites (spot)	26.00-28.00
Brazilian iron ore, 68-69% (spot)	30.00-31.00

Tungsten Ore
Net ton unit, duty paid

Foreign wolframite and scheelite, per net ton unit	$65.00
Domestic scheelite, mines	65.00

Manganese Ore

Manganese, 48% nearby, $1.18-1.22 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; shipments against old contracts for 48% ore are being received from some sources at 85c-87c.

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African	
48% 2.8:1	$39.00-42.00
48% 3:1	44.00-45.00
48% no ratio	30.00-32.00
South African Transvaal	
44% no ratio	$27.00-28.00
48% no ratio	34.00-35.00
Brazilian	
44% 25:1 lump	nom.
Rhodesian	
45% no ratio	$29.00
48% no ratio	31.50-32.00
48% 3:1 lump	50.00-51.00
Domestic—rail nearest seller	
48% 3:1	$39.00

Molybdenum

Sulphide concentrates per lb, molybdenum content, mines	$1.00

REFRACTORIES

(Ceiling prices, effective Feb. 12, 1952. per 1000 units)

Fire Clay Brick

High-Heat Duty: Pueblo, Colo., $85; Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lochhaven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., Woodbridge, N. J., $94.60; Salina, O., $99.60; Niles, O., $104; Los Angeles, Pittsburg, Calif., $126.

Silica Brick

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., $94.60; Hays, Pa., $100.10; Niles, O., $102; E. Chicago, Ind., Joliet, Rockdale, Ill., $104.50; Cutler, Utah, $111; Los Angeles, $117.

Insulating Fire Brick

2300° *F:* Massillon, O., $170; Clearfield, Pa., $171; Augusta, Ga., Beaver Falls, Zelienople, Pa., Mexico, Mo., $178.

Ladle Brick

Dry Pressed: Bessemer, Ala., $61.60; Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Wellsville, O., $66; Mexico, Mo., $70; Clearfield, Pa., Portsmouth, O., $79.20; Perla, Ark., $88; Los Angeles, $105; Pittsburg, Calif., $106.

Sleeves

Reesdale, Pa., $121; Johnstown, Pa., $121.30; Clearfield, Pa., $128.70; St. Louis, $131.45; Athens, Tex., $134.20.

Nozzles

Reesdale, Pa., $193.60; Johnstown, Pa., $198.55; Clearfield, Pa., $209; St. Louis, $213.95; Athens, Tex., $214.50.

Runners

Reesdale, Pa., $150.70; Johnstown, Pa., $154; Clearfield, Pa., $160; St. Louis, $162.25; Athens, Tex., $166.10.

High-Alumina Brick

50 *Per Cent:* Clearfield, Pa., St. Louis, Mexico, Mo., $158.40; Danville, Ill., $161.40.
60 *Per cent:* St. Louis, Mexico, Vandalia, Mo., $200.20; Danville, Ill., $203.20.
70 *Per cent:* St. Louis, Mexico, Vandalia, Mo., $233.20; Danville, Ill., $236.20; Clearfield, Pa., $240.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 20.8c, ton lot 22.3c, less ton 23.3c. Delivered. Spot add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 10.0c per lb of alloy, carload packed 20.2c, ton lot 22.1c, less ton 23.6c. Deld. Spot add 0.25c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 30-43%, Fe 40-45%, C 0.20% max.). Contract, c.l. lump, bulk 7.0c per lb of alloy, c.l. packed 7.75c, ton lot 8.5c, less ton 9.35c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed. Spot add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3⅜ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 14.50c per lb of briquet, carload packed 15.2c, ton 16.0c, less ton 16.9c. Deld. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 10.95c per lb of briquet, c.l. packaged 11.75c, ton lot 12.55c, less ton 13.45c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 11.15c, per lb of briquet, c.l. packed 11.95c, ton lot 12.75c, less ton 13.65c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size — weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.95c per lb of briquet, c.l. packed 7.75c, ton lot 8.85c, less ton 9.45c. Delivered. Spot, add 0.25c.

(Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 7.1c, c.l. packed 7.9c, ton lot 8.7c, less ton 9.6c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

NOTE: For current quotations on manganese, titanium and "other" ferroalloys, see page 163, July 7 issue; for chromium, silicon, vanadium, boron, tungsten alloys, page 125, June 30 issue.

CEILING PRICES, IRON AND STEEL SCRAP

Prices as set forth in Office of Price Stabilization ceiling price regulation No. 5, as amended Feb. 5, 1952.

STEELMAKING SCRAP COMPOSITE

July 10	$42.48
July 3	42.33
June, 1952	42.63
July, 1951	44.00
July, 1947	37.23

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

Basing point ceiling prices per gross ton from which maximum shipping prices are computed on scrap of dealer and industrial origin; and from which ceiling on-line and ceiling delivered prices are computed on scrap of railroad origin.

Basing Point	No. 1 Bundles Dealer, Industrial	No. 1 Heavy Melt Railroad
Alabama City, Ala.	$39.00	$41.00
Ashland, Ky.	42.00	44.00
Atlanta, Ga.	39.00	41.00
Bethlehem, Pa.	42.00	44.00
Birmingham, Ala.	39.00	41.00
Brackenridge, Pa.	44.00	46.00
Buffalo, N. Y.	43.00	45.00
Butler, Pa.	44.00	46.00
Canton, O.	44.00	46.00
Chicago, Ill.	42.50	44.50
Cincinnati, O.	43.00	45.00
Claymont, Del.	42.50	44.50
Cleveland, O.	43.00	45.00
Coatesville, Pa.	42.50	44.50
Conshohocken, Pa.	42.50	44.50
Detroit, Mich.	41.15	43.15
Duluth, Minn.	40.00	42.00
Harrisburg, Pa.	42.50	44.50
Houston, Tex.	37.00	39.00
Johnstown, Pa.	44.00	46.00
Kansas City, Mo.	39.50	41.50
Kokomo, Ind.	42.00	44.00
Los Angeles	35.00	37.00
Middletown, O.	43.00	45.00
Midland, Pa.	44.00	46.00
Minnequa, Colo.	38.00	40.00
Monessen, Pa.	44.00	46.00
Phoenixville, Pa.	42.50	44.50
Pittsburg, Calif.	35.00	37.00
Pittsburgh, Pa.	44.00	46.00
Portland, Oreg.	35.00	37.00
Portsmouth, O.	42.00	44.00
St. Louis, Mo.	41.00	43.00
San Francisco	35.00	37.00
Seattle, Wash.	35.00	37.00
Sharon, Pa.	44.00	46.00
Sparrows Pt., Md.	42.00	44.00
Steubenville, O.	44.00	46.00
Warren, O.	44.00	46.00
Weirton, W. Va.	44.00	46.00
Youngstown, O.	44.00	46.00

Differentials from Base

Differentials per gross ton for other grades of dealer and industrial scrap:

O-H and Blast Furnace Grades

2.	No. 1 Busheling	Base
3.	No. 1 Heavy Melting	—$1.00
4.	No. 2 Heavy Melting	— 1.00
5.	No. 2 Bundles	— 1.00
6.	Machine Shop Turnings	—10.00
7.	Mixed Borings and Short Turnings	— 6.00
8.	Shoveling Turnings	— 6.00
9.	No. 2 Busheling	— 4.00
10.	Cast Iron Borings	— 6.00

Elec. Furnace and Fdry. Grades

11.	Billet, Bloom & Forge Crops	+ 7.50
12.	Bar Crops & Plate	+ 5.00
13.	Cast Steel	+ 5.00
14.	Punchings & Plate Scrap	+ 2.50
15.	Electric Furnace Bundles	+ 2.00
	Cut Structurals & Plate:	
16.	3 feet and under	+ 3.00
17.	2 feet and under	+ 5.00
18.	1 foot and under	+ 6.00
19.	Briquetted Cast Iron Borings	Base
	Foundry, Steel:	
20.	2 feet and under	Base
21.	1 foot and under	+ 2.00
22.	Springs and Crankshafts	+ 1.00
23.	Alloy Free Turnings	— 3.00
24.	Heavy Turnings	— 1.00
25.	Briquetted Turnings	Base
26.	No. 1 Chemical Borings	— 3.00
27.	No. 2 Chemical Borings	— 4.00
28.	Wrought Iron	+10.00
29.	Shafting	+10.00
31.	Old Tin & Terne Plated Bundles	—10.00

Unprepared Grades

When compressed constitutes:

32.	No. 1 Bundles	— 6.00
33.	No. 2 Bundles	— 9.00
34.	Other than matherial suitable for hydraulic compression	— 8.00

Restrictions on Use

(1) Prices for Grades 11 and 23 may be charged only when shipped to a consumer directly from an industrial producer; otherwise ceiling prices shall not exceed prices established for Grades 12 and 8, respectively.

(2) Prices established for Grades 26 and 27 may be charged only when sold for use for chemical or annealing purposes, and in the case of Grade 27, for briquetting and direct charge into an electric furnace; otherwise ceiling prices shall not exceed price established for Grade 10.

(3) Prices established for Grade 28 may be charged only when sold to a producer of wrought iron; otherwise ceiling price shall not exceed ceiling price for corresponding grade of basic open-hearth.

(4) Premiums for Grades 11-18, 20 and 21 may be charged only when sold for use in electric and acid open-hearth furnaces or foundries; or in basic O-H or blast furnace under NPA allocation or OPS authorization.

(5) Prices for Grade 29 may be charged only when sold for forging or rerolling purpose.

Differentials from Base

Differentials per gross ton above or below the price of Grade 1 (No. 1 railroad heavy melting steel) for other grades of railroad steel scrap:

2.	No. 2 Heavy Melting Steel	—$2.00
3.	No. 2 Steel Wheel	Base
4.	Hollow Bored Axles and loco. axles with keyways between the wheelseats.	Base
5.	No. 1 Busheling	— 3.50
6.	No. 1 Turnings	— 3.00
7.	No. 2 Turnings, Drillings & Borings	—12.00
8.	No. 2 Cast Steel and uncut wheelcenters	— 6.00
9.	Uncut Frogs, Switches.	Base
10.	Flues, Tubes & Pipes	— 8.00
11.	Structural, Wrought Iron and/or/steel, uncut	— 6.00
12.	Destroyed Steel Cars	— 8.00
13.	No. 1 Sheet Scrap	— 9.50
14.	Scrap Rails, Random Lengths	+ 2.00
15.	Rerolling Rails	+ 7.00
	Cut Rails:	
16.	3 feet and under	+ 5.00
17.	2 feet and under	+ 6.00
18.	18 inches and under	+ 8.00
19.	Cast Steel, No. 1	+ 3.00
20.	Uncut Tires	+ 2.00
21.	Cut Tires	+ 5.00
	Bolsters & Side Frames:	
22.	Uncut	Base
23.	Cut	+ 3.00
24.	Angles, Splice Bars & Tie Plates	+ 5.00
25.	Solid Steel Axles	+12.00
26.	Steel Wheels, No. 3 oversize	Base
27.	Steel Wheels, No. 3	+ 5.00
28.	Spring Steel	+ 5.00
29.	Couplers & Knuckles	+ 5.00
30.	Wrought Iron	+ 8.00
31.	Fireboxes	— 8.00
32.	Boilers	— 6.00
33.	No. 2 Sheet Scrap	—13.00
34.	Carsides, Doors, Car Ends, cut apart	— 6.00
35.	Unassorted Iron & Steel	— 6.00
36.	Unprepared scrap, not suitable for hydraulic compression	— 8.00

Preparation Charges

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of dealer or industrial origin authorized by OPS are:

(1) For preparing into Grades No. 3, No. 4 or No. 2, $8.
(2) For hydraulically compressing Grade No. 1, $6 per ton; Grade No. 5, $8.
(3) For crushing Grade No. 6, $3. For preparing into:
(4) Grade No. 25, $6.
(5) Grade No. 19, $6.
(6) Grades No. 12, No. 13, No. 14, No. 16, or No. 20, $10.
(7) Grade No. 17 or No. 21, $11.
(8) Grade No. 18, $12.
(9) For hydraulically compressing Grade No. 15, $8.
(10) For preparing into Grade No. 28, $10.

Ceiling fees per gross tons which may be charged for intransit preparation of any grade of steel scrap of railroad origin shall be:

(1) For preparing into Grade No. 1 and Grade No. 2, $8.
(2) For hydraulically compressing Grade No. 13, $6.

For preparing into:

(3) Grade No. 16, $4.
(4) Grade No. 17, $5.
(5) Grade No. 18, $7.
(6) Grade No. 21, $4.
(7) Grade No. 23, $4.

Ceiling fees per gross ton which may be charged for intransit preparation of cast iron are limited to:

(1) For preparing Grade No. 8 into grade No. 7, $9.
(2) For preparing Grade No. 3 into Grade No. 11, $7.
(3) For preparing Grade No. 3 into Grade No. 1, $4.

Premium for Alloy Content

No premium may be charged for alloy content except: $1.25 per ton for each 0.25% of nickel where scrap contains not less than 1% and not over 5.25% nickel; $2 per ton for scrap containing not less than 0.15 per cent molybdenum and $3 for scrap containing not less than 0.65% molybdenum; for scrap containing not less than 10% manganese, $4 for scrap in sizes larger than 12 x 24 x 8 in., and $14 for scrap cut in that size or smaller (applicable only if scrap is sold for electric furnace uses or on NPA allocation); $1 for scrap conforming to SAE 52100.

CAST IRON SCRAP

Ceiling price per gross ton for following grades shall be f.o.b. shipping point:

	Cast Iron:	
1.	No. 1 (Cupola)	$49.00
2.	No. 2 (Charging Box)	47.00
3.	No. 3 (Hvy. Breakable)	45.00
4.	No. 4 (Burnt Cast)	41.00
5.	Cast Iron Brake Shoes	41.00
6.	Stove Plate	46.00
7.	Clean Auto Cast	52.00
8.	Unstripped Motor Blocks	43.00
9.	Wheels, No. 1	47.00
10.	Malleable	55.00
11.	Drop Broken Machinery	52.00

OPEN MARKET

Birmingham
(Delivered)

No. 1 cupola cast	$42.00
Stove plate	37.00
Charging box cast	39.00-40.00
Heavy breakable	36.00-37.00
Drop broken machinery	42.00-43.00
Unstripped motor blocks	35.00-36.00

Boston
(F.o.b. shipping point)

No. 1 cupola cast	32.00
Heavy breakable	30.00
Stove plate	30.00
Unstripped motor blocks	28.00

Buffalo
(Delivered)

No. 1 heavy melting	37.00*
No. 2 heavy melting	37.00*
No. 1 Bundles	38.00*
No. 1 busheling	38.00*
No. 2 bundles	37.00*
Machine shop turnings.	27.00*
Mixed borings, turnings	31.00*
Cast iron borings	31.00*
Short shoveling turnings	31.00*
No. 1 cupola cast	41.00-42.00*
No. 1 machinery cast	42.00-43.0*

* Nominal.

Chicago
(Delivered)

No. 2 heavy melting	38.50
No. 2 bundles	38.50
Machine shop turnings.	26.00-27.00
Mixed borings, turnings	31.00-32.00
Shoveling turnings	31.00-32.00
Cast iron borings	31.00-32.00
No. 1 cupola cast	43.00-47.00
Charging box cast	39.00-41.00
Heavy breakable	36.00-38.00
Burnt cast	36.00-38.00
Cast iron brake shoes	40.00-41.00
Stove plate	36.00-41.00
Clean auto cast	43.00-45.00
Unstripped motor blocks	33.00-35.00
Malleable	48.00-50.00
Drop broken machinery	45.00-50.00

Cleveland
(Delivered)

No. 2 heavy melting	37.00-38.00*
No. 2 bundles	37.00-38.00*
No. 1 cupola cast	45.00-46.00
Drop broken machinery	50.00-51.00*

* Nominal.

Detroit
(Brokers' buying prices; f.o.b. shipping point)

Machine shop turnings.	24.00-25.00
No. 1 cupola cast	43.00-44.00
Heavy breakable	39.00
Clean auto cast	46.00-47.00
Unstripped motor blocks	36.00-37.00
Drop broken machinery.	46.00-47.00
Stove plate	42.00-43.00
Charging box cast	43.00

New York
(Brokers' buying prices; delivered consumers' plants)

Cupola cast	38.00
Unstripped motor blocks	34.00

Philadelphia
(Delivered)

No. 1 heavy melting	41.00
No. 2 heavy melting	39.00
No. 1 bundles	42.50
No. 2 bundles	39.00
No. 1 busheling	42.50
Mixed borings, turnings	34.50
Machine shop turnings.	30.00
Short shoveling turnings	34.50
No. 1 cupola cast	38.00
Unstripped motor blocks	35.00
Heavy breakable	39.50
Machinery cast	46.00-48.00

Pittsburgh
(Delivered)

No. 1 cupola cast	46.00
Heavy breakable	45.00

Youngstown
(Delivered)

No. 2 heavy melting	38.00-39.00*
No. 2 bundles	38.00-39.00*
Machine shop turnings.	34.00*

* Nominal.

San Francisco
(Delivered)

No. 2 bundles	30.00
No. 1 cupola cast	42.00

Seattle
(F.o.b. shipping point)

No. 2 bundles	29.00
No. 1 cupola cast	39.00-40.00
Heavy breakable	35.00-40.00

St. Louis
(Delivered)

No. 1 cupola	41.00
Stove plate	39.00
Unstripped motor blocks	35.00

HAMILTON, ONT.
(Delivered Prices)

Heavy Melt.	$35.00
No. 1 Bundles	35.00
No. 2 Bundles	35.00
Mechanical Bundles	31.50
Mixed Steel Scrap	31.00
Mixed Borings, Turnings	32.00
Rails, Remelting	35.00
Rails, Rerolling	38.00
Busheling	29.50
Bushelings new factory:	
Prep'd	33.00
Unprep'd	31.00
Short Steel Turnings	32.00
Cast Iron Grades*	
No. 1 Machinery Cast	50.00

* F.O.B. shipping point.

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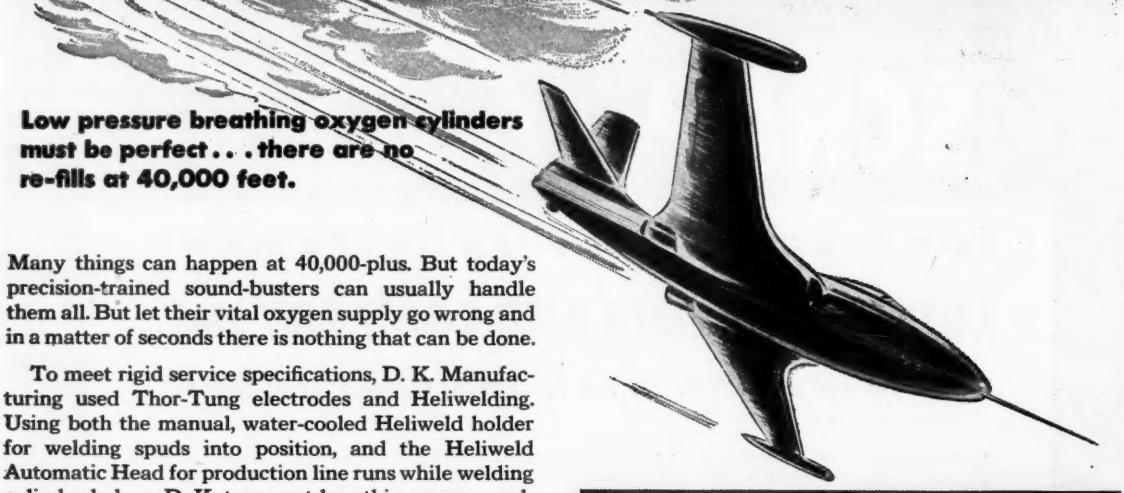
CHICAGO, ILLINOIS 100 W. Monroe St.
HOUSTON, TEXAS 1114 Texas Av Bldg.
PITTSBURGH, PA. Oliver Building
BOSTON, MASS. Statler Building
CLEVELAND, OHIO 1022 Midland Bldg.
LEBANON, PENNA. Luria Building
PUEBLO, COLORADO 334 Colorado Bldg.
BUFFALO, N. Y. Genesee Building
DETROIT, MICHIGAN 2011 Book Building
NEW YORK, N. Y. 100 Park Avenue
READING, PENNA. Luria Building
ST. LOUIS, MISSOURI 2052 Railway Exchange Bldg.
SAN FRANCISCO, CALIFORNIA Pacific Gas & Elec. Co., Bldg.

LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Berman

HOLDING A CLOUD-BUSTER'S BREATH



Low pressure breathing oxygen cylinders must be perfect . . . there are no re-fills at 40,000 feet.

Many things can happen at 40,000-plus. But today's precision-trained sound-busters can usually handle them all. But let their vital oxygen supply go wrong and in a matter of seconds there is nothing that can be done.

To meet rigid service specifications, D. K. Manufacturing used Thor-Tung electrodes and Heliwelding. Using both the manual, water-cooled Heliweld holder for welding spuds into position, and the Heliweld Automatic Head for production line runs while welding cylinder halves, D. K. turns out breathing oxygen cylinders which test a leak-free 700 psi – hundreds of pounds above working pressure requirements.

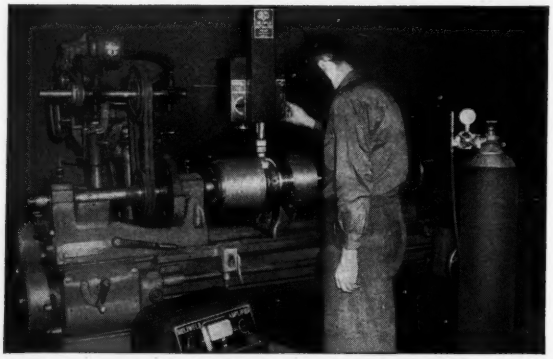
Inert gas-shielded Heliwelding eliminates the need for flux . . . prevents slag formation–permitting 'clear view' operation. Its gas-shielded electrode provides a highly concentrated arc . . . permitting exceptional welding speeds with a minimum of distortion.

Production-running these oxygen lifesavers is just one of the countless jobs Heliwelding can do in your plant or shop. Find out how it can be used for you. Write . . . or phone your nearest Airco Office. Ask for your copy of ADC-709: "Heliwelding–Catalog 9".

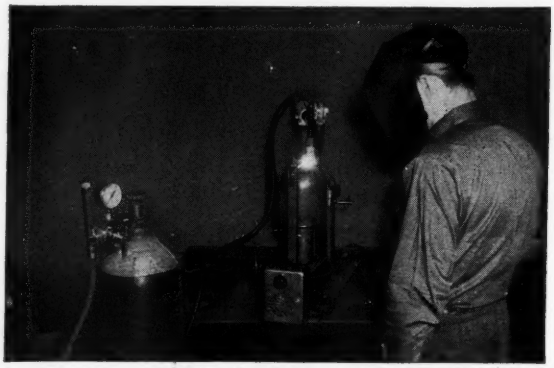
AT THE FRONTIERS OF PROGRESS YOU'LL FIND

AN AIR REDUCTION PRODUCT

Completed Breathing oxygen cylinders.



Manufactured by the D. K. Manufacturing Company, Chicago, Illinois, breathing oxygen cylinders like those above must be the products of perfect welding. To insure perfection on a production-run basis D. K. uses Heliwelding for their construction.



Companion-piece of the Heliweld Automatic Head, this jig-mounted manual, water-cooled Heliweld Holder fastens outlet spuds at the rate of nearly two hundred a day to begin the production run of oxygen breathing cylinders for D. K. Manufacturing Co.

AIRCO®

DEALERS AND OFFICES IN PRINCIPAL CITIES

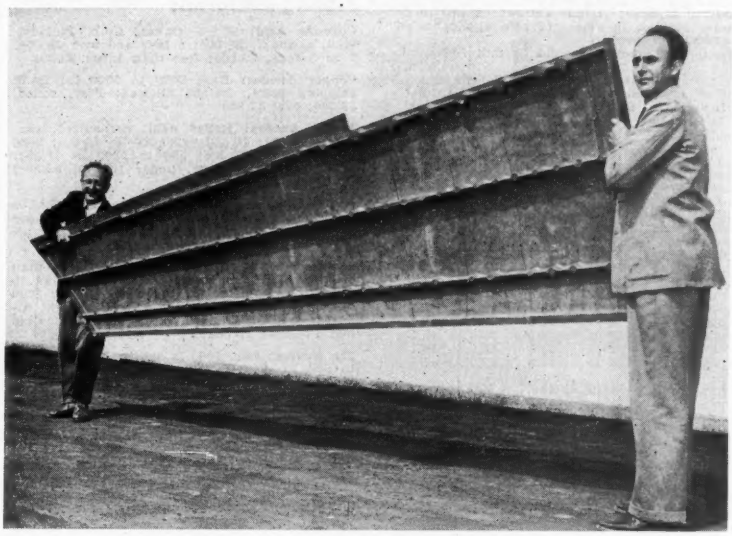
AIR REDUCTION

AIR REDUCTION SALES COMPANY • AIR REDUCTION MAGNOLIA COMPANY • AIR REDUCTION PACIFIC COMPANY

REPRESENTED INTERNATIONALLY BY AIRCO COMPANY INTERNATIONAL

DIVISIONS OF AIR REDUCTION COMPANY, INCORPORATED

The Metal Market



Co-operation Pays Off for Magnesium

As the result of co-operation between Northrop Aircraft Inc., Hawthorne, Calif., and Aluminum Co. of America, Pittsburgh, this 16-foot airplane wing section was cast in a single piece from featherweight magnesium. The sample section is part of a research program sponsored by the Air Force. Northrop and Alcoa believe that it marks substantial progress in making wing castings from magnesium

Labor troubles are prolonging the duration of controls over metals. Production losses this year are the difference between metal for all and continued shortages

STRIKES—past, present and future—are inexorably changing the timetable of decontrol. Despite spectacular reversals in supply of many metals, labor troubles will keep industry under controls longer than expected.

Production losses this year are the difference between sufficient metal for all purposes and continuing or developing constrictions. Unless there's a remarkable change in the consumption pattern, there's little likelihood of a completely balanced metal diet this year or part of next.

The Culprit—Stopping the flow of one metal has its effect both on related metals and on competing ones. Net result is supply distortion and unbalance for fabricators. Steel troubles are a big factor. They've changed the outlook for nonferrous metals, many of which themselves are under the strike cloud.

The labor woes account in great measure for some surpluses too. Prime western zinc is an obvious example. Lead is another. One large lead user says he has too much lead if the steel strike continues and not nearly enough if it ends quite soon.

Change of Emphasis — In scarce materials, the shoe's on the other foot now. Earlier this year, most types of steel had eased substantially, leaving copper and to a lesser extent aluminum as the critical metals. For the rest of CMP's life, steel will be controlling and pressure will be off copper and aluminum producers so long as output is steady or rising.

Official recognition of the nonferrous ease is seen in DPA's newest list of critical materials. For the first time in the classification's existence, aluminum, copper, tin, tungsten and platinum weren't in the "most critical" category.

Disquieting—As metals came into balance, Washington has further plans for them. A civilian stockpile for all metals in good supply is more than just a possibility. Lead—30,000 tons—is being bought for intermediate stockpiling now, zinc will be next, and other metals could join the list quickly.

The strategic stockpile will be bolstered too. In the fourth quarter copper will be purchased to replace stocks released in the past year. Aluminum producers must earmark 15,500 tons of their fourth-quarter ingot output for the stockpile.

Normal Lead Times Return

Normal lead time limits are being considered by DPA in letting industry order copper and aluminum now for fourth-quarter delivery. Although steel allocations aren't known yet, users of copper and aluminum can restore inventory balance.

Heavy Increase in Light Metal

A fourfold increase in magnesium production—to 4000 tons yearly—will result from Aluminum Co. of Canada's $2 million expansion at Arvida, Quebec. The program stems from an agreement to sell the United Kingdom 2649 tons of magnesium yearly for the next 20 years.

Alcan's aluminum, disparaged by some members of Congress, is helping Alcoa make up for production losses at its storm-damaged Massena, N. Y., plant. In the next month over 4000 tons of aluminum ingot will be shipped from Canada.

Reluctant Scrap Buyers

Lowered sales of aluminum, brass and bronze ingots plus mass vacations in industry are curtailing scrap buying. Copper alloy, zinc and aluminum scrap dealers are having difficulty in moving the metal. Strongest demand is currently for copper and lead scrap. The lead situation is temporary, not a true indication of the market trend. New batteries are selling slowly, so there are few old ones turned in and buyers are scrambling for what's available.

Nonferrous Briefs

A third round of domestic aluminum expansion has been agreed on but the amount is still in doubt. . . Custom smelters of copper from foreign ores expect a pricing order revision soon. . .Zinc import duties will go back about Aug. 1. . .Watch for a new general overriding regulation permitting consumers of steel and brass mill products to boost prices once steel settlement is reached. . . Brass mills are buying their entire July allowances of foreign copper, though on vacations. Reason—dangerously low inventories.

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 24.50c, Conn. Valley Lake 24.62½c, delivered.

Brass Ingots: 85-5-5-5 (No. 115) 27.25c, 88-10-2 (No. 215) 40.00c; 80-10-10 (No. 305) 33.00c; No. 1 yellow (No. 405) 23.25c.

Zinc: Prime western 15.00c; brass special 15.25c; intermediate 15.50c, East St. Louis; high grade 16.35c, delivered.

Lead: Common 15.80c; chemical 15.90c; corroding 15.90c, St. Louis.

Primary Aluminum: 99% plus, ingots 19.00c, pigs 18.00c. Base prices for 10,000 lb and over. Freight allowed on 500 lb or more but not in excess of rate applicable on 30,000 lb c.l. orders.

Secondary Aluminum: Piston alloys 20.50c; No. 12 foundry alloy (No. 2 grade) 19.50c; steel deoxidizing grades, notch bars, granulated or shot; Grade 1, 18.80c; grade 2, 18.60c; grade 3, 18.40c; grade 4,18.20c.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over 24.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt 121.50c.

Antimony: American 99-99.8% and over but not meeting specifications below 39.00c; 99.8% and over (arsenic 0.05% max., other impurities 0.1% max.) 39.50c; f.o.b. Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 56.50; 25-lb pigs, 59.15c; "XX" nickel shot, 60.15c; "F" nickel shot or ingots, for addition to cast iron, 56.50c. Prices include import duty.

Mercury: Open market, spot, New York, $195, nominal, per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $1.56 per lb of alloy, f.o.b. Reading, Pa.

Cadmium: "Regular" straight or flat forms, $2.25 del.; special or patented shapes $2.40.

Cobalt: 97.99%, $2.40 per lb for 500 lb (kegs); $2.42 per lb for 100 lb (case); $2.47 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York 82.75c per oz.

Platinum: $90-$93 per ounce from refineries.

Palladium: $24 per troy ounce.

Iridium: $200 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Ceiling prices, cents per pound, f.o.b. mill, effective July 1, 1952)

Sheet: Copper 45.52; yellow brass 40.17; commercial bronze, 95% 45.15; 90% 44.38; red brass, 85% 43.10; 80% 42.34; best quality, 41.35; nickel silver, 18%, 55.08; phosphor-bronze grade A, 5%, 64.71.

Rod: Copper, hot-rolled 41.37; cold-drawn 42.62; yellow brass free cutting, 33.85; commercial bronze 95%, 44.84; 90% 44.07; red brass 85%, 42.79; 80%, 42.03.

Seamless Tubing: Copper 45.56; yellow brass 43.18; commercial bronze, 90%, 47.04; red brass, 85%, 46.01.

Wire: Yellow brass 40.46; commercial bronze, 95%, 45.44; 90%, 44.67; red brass, 85%, 43.39; 80%, 42.63; best quality brass, 41.64.

(Base prices, effective July 1, 1952)

Copper Wire: Bare, soft, f.o.b. eastern mills, 100,000 lb lots, 32.795; 30,000 lb lots, 32.92; l.c.l., 33.42. Weatherproof, 100,000 lb, 30.60; 30,000 lb, 33.85; l.c.l., 34.35. Magnet wire del., 15,000 lb or more,, 38.75; l.c.l., 39.50.

ALUMINUM

(30,000 lb base; freight allowed on 500 lb or more, but not in excess of rate applicable on 30,000 lb c.l. orders)

Sheets and Circles: 2s and 3s mill finish c.l.

Thickness Range Inches	Widths or Diameters, In., Inc.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	30.1	...	...
0.135-0.096	12-48	30.6	...	...
0.095-0.077	12-48	31.2	29.1	33.2
0.076-0.061	12-48	31.8	29.3	33.4
0.060-0.048	12-48	32.1	29.5	33.7
0.047-0.038	12-48	32.5	29.8	34.0
0.037-0.030	12-48	32.9	30.2	34.6
0.029-0.024	12-48	33.4	30.5	35.0
0.023-0.019	12-36	34.0	31.1	35.7
0.018-0.017	12-36	34.7	31.7	36.6
0.016-0.015	12-36	35.5	32.4	37.6
0.014	12-24	36.5	33.3	38.9
0.013-0.012	12-24	37.4	34.0	39.7
0.011	12-24	38.4	35.0	41.2
0.010-0.0095	12-24	39.4	36.1	42.7
0.009-0.0085	12-24	40.6	37.2	44.4
0.008-0.0075	12-24	41.9	38.4	46.1
0.007	12-18	43.3	39.7	48.2
0.006	12-18	44.8	41.0	52.8

* Lengths 72 to 180 inches. † Maximum diameter, 26 inches.

Screw Machine Stock: 5000 lb and over.

Dia. (in.) or distance across flats	—Round— R317-T4	——Hexagonal—— 17S-T4	17S-T4
0.125	52.0	....	....
0.156-0.0188	44.0	....	....
0.219-0.313	41.5	....	....
0.375	40.0	46.0	48.0
0.406	40.0	....	....
0.438	40.0	46.0	48.0
0.469	40.0	....	....
0.500	40.0	46.0	48.0
0.531	40.0	....	....
0.563	40.0	....	45.0
0.594	40.0	....	....
0.625	40.0	43.5	45.0
0.688	40.0	....	45.0
0.750-1.000	39.0	41.0	42.5
1.063	39.0	....	41.0
1.125-1.500	37.5	39.5	41.0
1.563	37.0	....	....
1.625	36.5	....	39.5
1.688-2.000	36.5	....	....

LEAD

(Prices to jobbers f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more $21.00 per cwt; add 50c cwt 10 sq ft to 140 sq ft. Pipe: Full coils $21.00 per cwt. Traps and bends: List prices plus 50%.

ZINC

Sheets 23.00c, f.o.b. mill 36,000 lb and over. Ribbon zinc in coils, 21.25c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 22.50c; over 12-in., 22.50-23.00c.

"A" NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 77.00c. Strip, cold-rolled, 83.00c. Rods and shapes, 73.00c. Plates, 75.00c. Seamless tubes, 106.00c.

MONEL

(Base prices f.o.b. mill)

Sheets, cold-rolled 60.50c. Strip, cold-rolled 63.50c. Rods and shapes, 58.50c. Plates, 59.50c. Seamless tubes, 93.50c. Shot and blocks, 53.50c.

MAGNESIUM

Extruded Rounds 12 in. long, 1.31 in. in diameter, less than 25 lb, 55.00-62.00c; 25 to 99 lb, 45.00-52.00c; 100 lb to 5000 lb, 41.00c.

TITANIUM

Rodes per lb 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $10; forgings, $6; hot-rolled and forged bars, $6.

Plating Materials

Chromic Acid: 99.9% flakes, f.o.b. Philadelphia, carloads, 28.00c; 5 tons and over 28.50c; 1 to 5 tons, 29.00c; less than 1 ton 29.50c.

Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed: Flat, rolled, 38.34c; oval 37.84c.

Nickel Anodes: Rolled oval, carbonized, carloads, 74.50c; 10,000 to 30,000 lb, 75.50c; 3000 to 10,000 lb, 76.50c; 500 to 3000 lb 77.50c; 100 to 500 lb, 79.50c; under 100 lb, 82.50c; f.o.b. Cleveland.

Nickel Chloride: 36.50c in 100 lb bags; 34.50c in lots of 400 lb through 10,000 lb; 34.00c over 10,000 lb, f.o.b. Cleveland, freight allowed on 400 lb or more.

Sodium Stannate: 25 lb cans only, less than 100 lb to consumers 86.7c; 100 or 350 lb drums only, 100 to 600 lb 71.60c; 700 to 1900 lb, 69c; 2000 to 9900 lb, 67.3c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Tin Anodes: Bar, 1000 lb and over, $1.375; 500 to 999 lb, $1.38; 200 to 499 lb, $1.385; less than 200 lb, $1.40. Freight allowed east of Mississippi and north of Ohio and Potomac.

Zinc Cyanide: 100 lb drums, less than 10 drums 54.30c, 10 or more drums, 52.30c, f.o.b. Niagara Falls, N. Y.

Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb $1.11; more than 2000 lb, $1.09. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Stannous Choride (Anhydrous): In 400 lb bbl, 98.5c; 100 lb kegs 99.5c. Freight allowed.

Scrap Metals

Brass Mill Allowances

Ceiling prices in cents per pound for less than 20,000 lb, f.o.b. shipping point, effective June 26, 1951.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	21.50	21.50	20.75
Yellow Brass	19.125	18.875	17.875
Commercial Bronze			
95%	20.50	20.25	19.75
90%	20.50	20.25	19.75
Red Brass			
85%	20.25	20.00	19.375
80%	20.125	19.875	19.375
Muntz metal	18.125	17.875	17.375
Nickel silver, 10%	21.50	21.25	10.75
Phos. Bronze, 5%	25.25	25.00	24.00

Copper Scrap Ceiling Prices

(Base prices, cents per pound, less than 40,000 lb f.o.b. point of shipment)

Group 1: No. 1 copper 19.25; No. 2 copper wire and mixed heavy 17.75; light copper 16.50; No. 1 borings 19.25; No. 2 borings 17.75; refinery brass, 17.00 per lb of dry Cu content for 50 to 60 per cent material and 17.25 per lb for over 60 per cent material. Group II: No. 1 soft red brass solids 18.50; No. 1 composition borings 19.25 per lb of Cu content plus 63 cents per lb of tin content; mixed brass borings 19.25 per pound of Cu content plus 60 cents per lb of tin content; unlined red car boxes 18.25; lined red car boxes 17.25; cocks and faucets 16.00; mixed brass screens 16.00; zincy bronze solids and borings 16.25.

Aluminum Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment, less than 5000 lb)

Segregated plant scrap: 2s solids, copper free, 10.50; high grade borings and turnings, 8.50; No. 12 piston borings and turnings, 7.50. Mixed plant scrap: Copper-free solids, 10.00; dural type, 9.00. Obsolete scrap: Pure old cable, 10,00; sheet and sheet utensils, 7.25; old castings and forgings, 7.75; clean pistons, free of struts, 7.75; pistons with struts, 5.75.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Lead: Heavy 12.00-12.25; battery plates 7.00-7.50; linotype and stereotype 13.50-14.00; electrotype 12.00-12.50; mixed babbitt 14.50-14.75.

SMELTERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Zinc: Old zinc, 8.75; new die cast scrap, 8.50; old die cast scrap, 8.50.

DAILY PRICE RECORD

1952	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
July 1-10	24.50	15.80	15.00	121.50	19.00	39.00	56.50	82.75
June 24-30	24.50	15.80	15.00	121.50	19.00	39.00	56.50	82.75
June 23	24.50	15.30	15.00	121.50	19.00	39.00	56.50	82.75
June 18-21	24.50	14.80	15.00	121.50	19.00	39.00	56.50	82.75
June 5-17	24.50	14.80	16.00	121.50	19.00	39.00	56.50	82.75
June 2-4	24.50	14.80	17.50	121.50	19.00	39.00	56.50	82.75
June Avg.	24.50	15.06	15.74	121.50	19.00	39.00	56.50	82.75
May Avg.	24.50	15.519	19.50	121.50	19.00	42.077	56.50	85.356
Apr. Avg.	24.50	18.723	19.50	121.50	19.00	49.077	56.50	88.00
Mar. Avg.	24.50	18.80	19.50	121.50	19.00	50.00	56.50	88.00
Feb. Avg.	24.50	18.80	19.50	121.50	19.00	50.00	56.50	88.00
Jan. Avg.	24.50	18.80	19.50	109.404	19.00	50.00	56.50	88.00

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99%, del; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked. Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

C-O-TWO helped in making America's newest super liner *SAFEST AFLOAT*

VITAL AREAS
aboard
S. S. UNITED STATES
protected by
SMOKE FIRE
DETECTING
and
CARBON DIOXIDE
FIRE EXTINGUISHING

BUILT BY NEWPORT NEWS SHIPBUILDING AND DRY DOCK COMPANY

The designers and builders of United States Lines' new flagship, the S. S. UNITED STATES, made every effort to make her not only the world's finest, but also the safest. That's why, in addition to providing structural fire protection, modern, quick-acting C-O-TWO Marine Fire Protection Equipment has been installed in such vital areas as boiler rooms, pump rooms, electrical equipment stations, cargo holds, store rooms, repair shops and galleys.

In any compartment fitted with C-O-TWO Smoke Fire Detecting, the first trace of smoke is drawn through piping to the smoke detector in the wheelhouse. Immediately an alarm sounds and the exact location of the fire can be determined by looking at the designated non-glare observation window in the smoke detector.

Through the use of direction valves, clean, non-conducting, non-damaging carbon dioxide gas is discharged into any C-O-TWO protected area afire . . . the fire is extinguished in seconds, before it spreads and causes extensive damage. The pressure-operated discharge is an original C-O-TWO development permitting manual release of the control cylinder together with simultaneous discharge of a pre-determined number of cylinders necessary to fully flood the threatened area with carbon dioxide gas. This eliminates the individual manual release of all cylinders, as well as insures a high concentration of fire killing carbon dioxide gas.

• • •

Whether your fire protection problem is a ship, factory, power station or research center, an expert C-O-TWO Fire Protection Engineer will gladly help you in planning fully approved firesafety now before fire strikes. Get the facts today!

C-O-TWO AUDIBLE AND VISUAL SMOKE DETECTOR located in wheelhouse

C-O-TWO FIRE EQUIPMENT COMPANY
NEWARK 1 • NEW JERSEY
Sales and Service in the Principal Cities of United States and Canada
Affiliated with Pyrene Manufacturing Company

MANUFACTURERS OF APPROVED FIRE PROTECTION EQUIPMENT
Squeez-Grip Carbon Dioxide Type Fire Extinguishers • Dry Chemical Type Fire Extinguishers • Built-In Smoke and Heat Fire Detecting Systems
Built-In High Pressure and Low Pressure Carbon Dioxide Type Fire Extinguishing Systems

"Joe, getting small metal parts with precision tolerances is always a problem."

"Not when we have Torrington make them, Tom. Their production methods and facilities are among the finest in the world."

The methods used by our Specialty Department in the production of precision metal parts are the result of over 86 years of constant effort to decrease the cost and improve the quality of our own products. Most operations are performed on automatic and semi-automatic machines – many of them Torrington-designed – that assure uniform quality and precision. The latest heat-treating and finishing practices give proper temper and hardness. And mass-production techniques make possible the greatest possible economy on any quantity of small metal components.

If *you* need precision metal parts, ask us for a quotation. Just send us a blueprint or sample and tell us how many you need. The low cost will surprise you!

THE TORRINGTON COMPANY
Specialty Department
556 Field Street • Torrington, Conn.
Makers of
TORRINGTON NEEDLE BEARINGS

Sheets, Strip . . .

Sheet and Strip Prices, Page 155 & 156

Cleveland — Sheetmakers are already almost two months behind on production because of the strike. This means each additional day the work stoppage is prolonged lessens chances for consumers to place tonnage on mill books for fourth quarter.

Philadelphia — Demand for some household appliances still lags but most manufacturers have reached the point where they could justifiably step up operations if they had more sheet tonnage on hand.

Pittsburgh — A lively conversion business is shaping up for the remainder of the year. Negotiations are underway with some nonintegrated producers but final arrangements await settlement of the strike.

Plates . . .

Plate Prices, Page 155

Chicago — Plate fabricators will manage to hang on for a while longer before steel supply is exhausted, but only because work schedules are being shortened.

Wire . . .

Wire Prices, Page 157

Boston — One Worcester mill has resumed operations and will invoke the Capehart price increases on wire averaging close to $3 per ton. Pressure for wire, notably specialties, is not impressive.

Tin Plate . . .

Tin Plate Prices, Page 156

San Francisco—One of the largest producers of cans reports good inventories of tin plate and no interruption so far in meeting military and civilian needs.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 155

Seattle—Effects of the steel strike will be serious in the Pacific Northwest for months. Shortages have been greatly aggravated since Coast plants unaffected by the walkout can furnish only a small portion of the area's requirements.

Steel Bars . . .

Bar Prices, Page 155

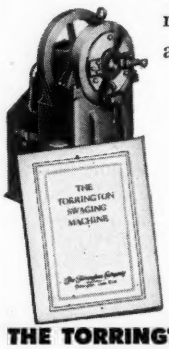
New York—Hot carbon bar consumers are concerned over the supply outlook. Inventories are greatly unbalanced.

Pittsburgh — Columbia Steel & Shafting Co., only district cold finisher not strikebound, is shut down for vacation and will not be able to resume production until hot-rolled bars begin to flow again.

Cleveland—Loss of bar tonnage as result of the steel strike just about knocks out all chances for consumers to get new orders on mill books for fourth quarter. Carryover from second to third quarter was large.

reducing troubles?

Torrington Swaging Machines offer a means of reducing rod, wire and tubing that improves the quality of the material, gives a better surface, without waste of stock. Hammer blows (4000 a minute) speed production, and give the metal toughness and resiliency that cannot be obtained by any other method.



Write for your free copy of "The Torrington Swaging Machine." This informative booklet gives complete details on the art of swaging and the extensive line of Torrington Swagers.

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Mercury Relay Stainless Tubing Specifications:

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OD tolerance ±.003"
ID tolerance +.000"
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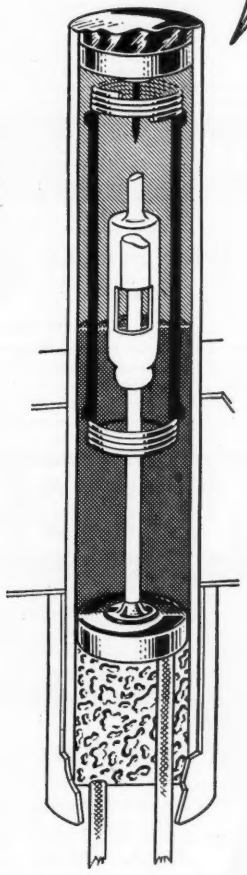

Super finish needed on the inside, to permit ID broaching without so much as a scratch or a pinhole! Tolerances have to be held just right on tube after tube after tube!

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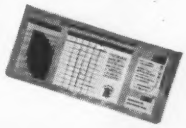
Slide Chart on Bending Stainless Tubing gives recommended bending radii and coil diameters for various sizes and gauges. To get good results on bending jobs and avoid waste of critical material, write for your copy.



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Alloy Tube Division, Union, N. J.
Export Dept.: The Carpenter Steel Co., Port Washington, N. Y.—"CARSTEELCO"

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—guaranteed on every shipment

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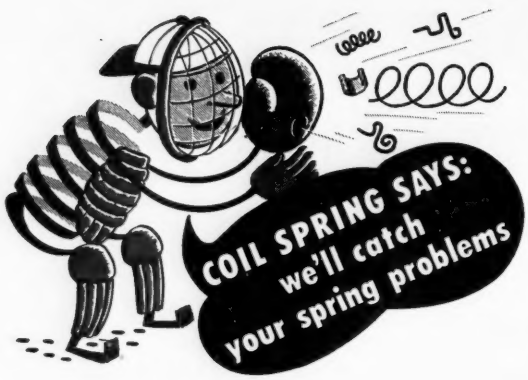

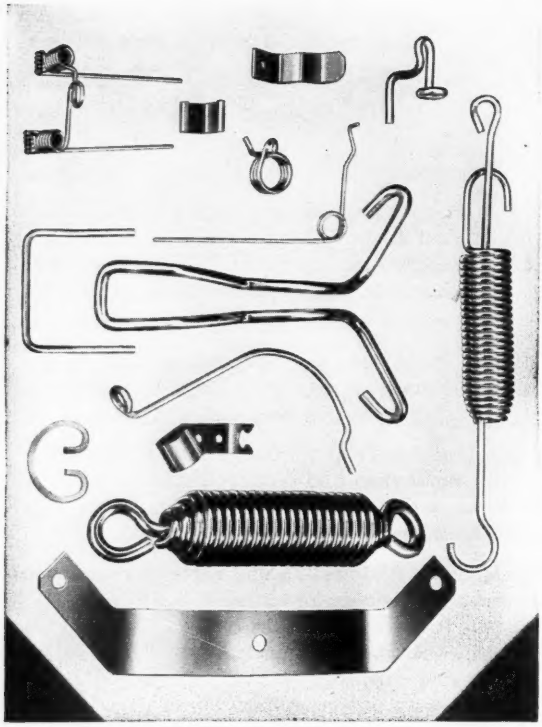

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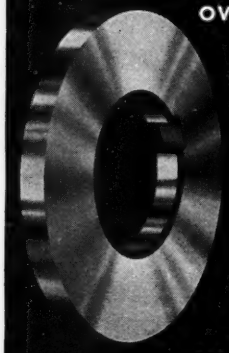

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Chicago—Cold-finished bar producers not strikebound are operating only two or three days weekly because of low hot-rolled bar stocks.

Los Angeles — Directives on bar mills of Kaiser Steel Corp. for the shell and fuze programs are huge.

Structural Shapes . . .

Structural Shape Prices, Page 155

Boston—Growing number of fabricated structural steel projects are being held up. Integrated shops are handicapped by unbalanced stocks of shapes.

New York—Aside from bridges and certain public projects, structural demand is spotty. Commercial work is not going ahead on the scale anticipated prior to the steel strike.

Pittsburgh—Structural fabricators will have to cut back operations in about two weeks unless the flow of steel resumes before then.

Tubular Goods . . .

Tubular Goods Prices, Page 159

Pittsburgh—Oil country goods remain in extremely short supply and a tight situation will prevail for months after the steel strike is settled.

Iron Ore . . .

Iron Ore Prices, Page 161

Cleveland—Only 104,661 gross tons of iron ore were brought down the lakes in the week ended July 7, a decrease of 2,805,910 tons compared with the movement in the like week a year ago. Loss of ore shipments because of the steel strike to date this season totals 13,066,774 gross tons, season's movement amounting to 21,607,119 tons against 34,673,893 a year ago.

Steelmakers are becoming increasingly concerned for ore supplies this winter. June shipments of 2,486,924 gross tons were 10,679,206 under the June, 1951, movement. Unless shipping is resumed promptly on a capacity scale indications are many blast furnaces may be idled this coming winter and spring by lack of ore.

Pig Iron . . .

Pig Iron Prices, Page 154

Detroit—Closing down of many foundries, both captive and jobbing shops, because of supply shortages and vacations, is reflected in slackening pig iron demand. Some shops will take in iron while closed if at all possible. Canadian iron is being used by some foundries, a premium of $15 to $20 being paid.

Boston — Foundry and malleable iron consumers will not take in contract tonnage this month in many cases and the Everett furnace is stocking more tonnage.

Pittsburgh — Foundries dependent on steel mill business are in difficult straits. Storage for finished castings that can't be shipped is a headache.

Cleveland—The foundries are not yet too seriously squeezed for pig iron supplies. Only a relatively few isolated requests for prompt ship-

"New Process"
Punches • Dies • Rivet Sets
Compression Riveter Dies
Made to highest standards and uniform quality thus insuring maximum service—
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Large inventory of stock sizes of round punches and dies also rivet sets available for immediate shipment. Square, rectangular, oblong and elliptical shapes made to order.
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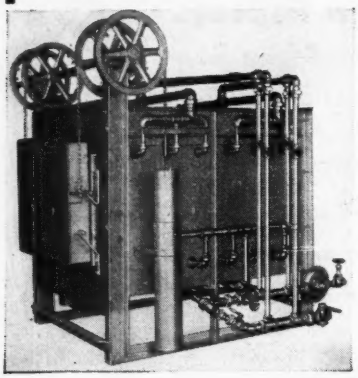
OVEN TYPE FURNACES



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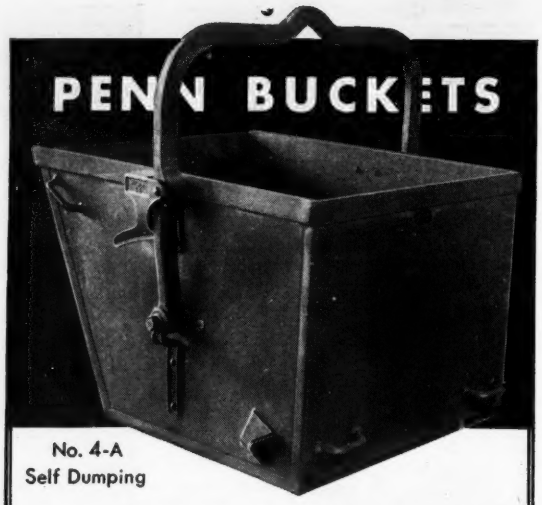

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ments are reported. In general, however, foundry iron inventories are estimated sufficient to support operations through a good part of August, especially since many shops were down the first two weeks of July for mass vacations. Latest statistics indicate shipments by the gray iron shops in April and May this year were at a rate averaging 70 to 80 per cent of shipments in the first six months of 1951.

Chicago—Jobbing gray iron foundries have enough pig iron on hand to restart operations when current vacations are ended.

Scrap . . .

Scrap Prices, Page 162

Washington—Effective July 12, a premium may be charged for iron and steel scrap containing less than 1 per cent but not less than ½ of 1 per cent nickel and between 5.25 and 7 per cent nickel. This is stipulated in Amendment 8 to CPR 5, issued last week by the Office of Price Stabilization.

Previously, a premium of $1.25 per gross ton for each ¼ of 1 per cent nickel content could be charged where the scrap contained not less than 1 per cent and not over 5.25 per cent nickel. No provision was made for scrap containing less than 1 per cent nickel, or for scrap containing over 5.25 per cent and up to 7 per cent nickel.

Philadelphia—Local steel mills not strike-bound are paying $38 delivered, plus brokerage, for No. 2 heavy melting and No. 2 bundles. Shipments of these grades are temporarily held up at Morrisville, Pa., pending installation of additional handling equipment. Higher prices are being paid for No. 1 and No. 2 bundles, borings and turnings, and some grades of cast.

Pittsburgh—Small amounts of distress dealer scrap reportedly are moving at prices below ceilings. No. 2 heavy melting and No. 2 bundles are quoted at $40 in these transactions. A nearby mill willing to buy a fairly substantial tonnage at $39 found few takers at that price.

Boston—Prices are soft on the small amount of steel and cast scrap moving. Volume done in steel scrap is largely for outside consumers, including some buying for the Morrisville, Pa., mill. In general, steel scrap is off at least $5 per ton.

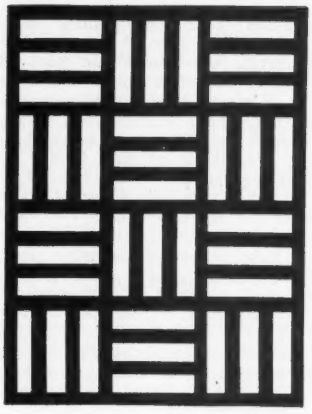
New York—Brokers report some strengthening in cast scrap demand. Betterment is ascribed to tightening pig iron supply. Recent buying of open-hearth scrap by the United States Steel Co., for its Fairless Works, Morrisville, Pa., resulted in such a volume of shipments that a hold-up may be necessary.

Buffalo—Scrap stocks mount in dealers' yards and along the waterfront. Receipts are tapering, however, with industrial plant operations sagging.

Detroit—Greater steel production in the Detroit area is putting some fire under the steel scrap market. Industrial material is rock-firm at ceiling. No. 2 grades of steel scrap still are about $3 off. Blast furnace material likewise is available under

Hendrick Ornametal

TRADE MARK



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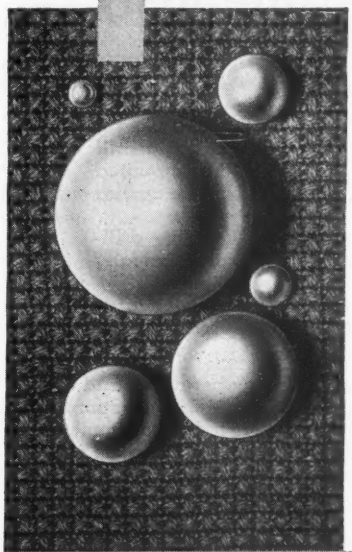
Perfection of Surface
Uniformity—Dependable Physical Quality



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OPS ceiling. Cast scrap is believed ready for an upswing.

Chicago—A stagnant situation maintains in the scrap market here. For the most part brokers and dealers are waiting out the steel strike. There is less gloom over the prospect of sagging prices than existed a week or two ago.

St. Louis—Scrap movement is slow with many holdup orders from struck mills and little being taken by those operating. Cast prices are firming under speculative interest.

Cleveland—The scrap market here is stagnant with the mills closed by the steel strike. Material is accumulating in dealers' yards and prices on the steelmaking grades are definitely on the easy side. In the absence of active trading prices in the open market are nominal with the No. 1 grades firm at ceiling but $37 to $38 delivered Cleveland being quoted on No. 2 heavy melting and No. 2 bundles, or about $4 to $5 per ton under government ceiling. Cast grades are somewhat stronger reflecting anticipated heavier demand from the foundries with a pig iron shortage threatening. Cupola cast is quoted $45 to $46 in the open market about $3 under ceiling, and drop broken machinery cast $50 to $51, off $1 from ceiling.

Los Angeles—Little scrap is moving in this district. Some traders expect a $3 price reduction on steelmaking scrap when the steel strike is ended.

San Francisco — Two mills are operating in this area. Consequently some steel scrap is flowing with the market sluggish. Cast grades are moving, No. 1 cupola holding at $42 a ton, delivered.

Warehouse . . .

Warehouse Prices, Page 161

Boston—Warehouse volume has not increased to the extent expected under strike conditions. In part this is due to lack of balance in inventory.

New York—Some distributors believe they have enough steel on hand to sustain sales at a fairly good rate over remainder of this month, but admit buyers will have to substitute sizes and specifications at an increasingly freer rate than heretofore.

Cleveland—Warehouse order volume this month will be under that of June. Stocks are low and highly unbalanced making it impossible for the individual warehouse to serve all requests coming to it.

Chicago—Warehouse demand continues good but a smaller percentage of inquiries is being accommodated as stocks worsen.

Los Angeles—Warehouse activity in June was 20 per cent greater than in May. The increase, however, was smaller than expected and trade observers say the figure indicates fabricators' steel stocks were ample.

Seattle—Warehouses report plates, wide flange sections and sheets are virtually unobtainable. Channels, flat bars and structurals are tight. Angles supply is sightly better than that of other items.

Canada . . .

Ottawa, Ont.—Canada's steel mills turned out 1,551,798 tons in the first five months this year, increase of 72,193 tons over output in the like period last year.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

500 tons, prefabricated hangar for King county, Washington, to Anderson Structural Steel Co., Los Angeles, low $110,500.

425 tons, power plant, Dow Chemical Co., Valasco, Tex., to Mosher Steel Co., Houston; Stone & Webster Engineering Corp., Boston, engineer-contractor.

120 tons, addition to Hanford power plant, to Isaacson Iron Works, Seattle; Bumstead-Woolford, Seattle, general contractors.

STRUCTURAL STEEL PENDING

2937 tons, state bridgework, Berks and Schuykill counties, Pennsylvania; being rebid July 18.

700 tons, warehouse, General Electric Co., revised bids to be asked shortly.

REINFORCING BARS . . .

REINFORCING BARS PENDING

275 tons, Statler Hotel, Hartford, Conn.

PLATES . . .

PLATES PLACED

175 tons, 500,000-gallon water tank, Avon Lake, O., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

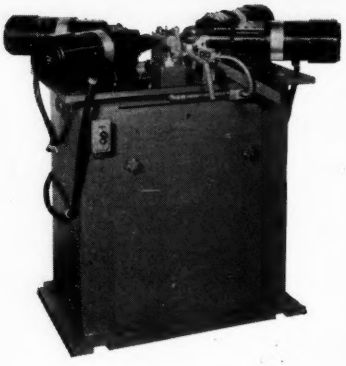
RAILS, CARS . . .

RAILROAD CARS PENDING

Alaska Railroad, 200 fifty-ton hopper cars, alternatives invited; bids to Federal Supply Service, Seattle July 28.

Missouri-Kansas-Texas, 500 fifty-ton box cars.

5 Spots Drilled Simultaneously In a Brass Ball



THIS machine incorporates four Model KH Govro-Nelson Drilling Units mounted horizontally to drill four spots of .140" diameter — also one Unit mounted vertically, drilling up from the bottom a .154" diameter hole in a small brass ball.

The operator loads the part manually. After the drilling operation, the manual unclamping automatically ejects the part into the chute.

With this set-up, the 5 operations are completed at a rate of one part each 4 seconds, including loading and unloading time.

If you have similar operations and would like to speed up your production rate, send samples and part prints and we shall be pleased to recommend the proper Automatic Units or quote on a complete set-up. Literature sent upon request.

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CONSTRUCTION—ENTERPRISE—ORGANIZATIONAL CHANGES

Army To Buy Mobile Foundry

Army Corps of Engineers issued procurement descriptions for purchase of a mobile foundry which it hopes to have within 30 to 45 days. Because this is a new development, no specifications beyond the description have been attempted. After the initial unit is set up and in operation at Ft. Belvoir, Va., specifications will be made for Army procurement of additional mobile foundries for other locations.

Pfaudler Seeks Japanese Outlet

Officials of Pfaudler Co., Rochester, N. Y., are negotiating to license some company in Japan to manufacture Pfaudler equipment for the Japanese market. Arrangements will be made similar to those in effect for many years with British and German firms.

Rotor Tool Co. Occupies New Plant

Rotor Tool Co. moved into its new plant at 26300 Lakeland Blvd., Cleveland. The company is celebrating its 25th anniversary this year.

Caine Steel To Build Warehouse

Caine Steel Co., Chicago, will build a $1.5 million warehouse at the corner of Central and Grand avenues. Caine is a jobber of flat rolls, strip steel, and coils and a maker of flat wire.

Ekco Embarks on New Project

Ekco Products Co., Chicago, closed arrangements with Tomado N. V. of Dordrect, Netherlands, to manufacture in Holland a line of wire and metal household and commercial products. Ekco will distribute the products made by Tomado as well as those to be made by Tomado under Ekco specifications.

Wheeling Gets Coking Coal Reserves

Harmar Coal Co. was organized to purchase all the surface lands, plant and equipment of the Harmarville and Oakmont coal mines from Consumers Mining Co., and to lease its coal reserves. The new firm is jointly owned by Wheeling Steel Corp., Wheeling, W. Va., and Pittsburgh Consolidation Coal Co., Pittsburgh. The Harmar Coal Co. also will lease from Pittsburgh Consolidation an acreage of coal reserves, thereby substantially increasing Wheeling's reserve of coking coal. The new company will have coal reserves estimated to contain about 60 million tons of coal, all of which will be available to Wheeling Steel Corp. George C. Trevorrow, general manager, Consumers Mining Co., will continue in that capacity with the new company.

Consolidated Boosts Forging Capacity

Plant capacity is being expanded by Consolidated Industries Inc., West Cheshire, Conn., to provide added facilities for its titanium forging operation. This expansion includes several new and larger drop hammers in order to provide a complete size range. In addition to forgings of titanium, aluminum and steels, the company is producing castings of aluminum, magnesium and other metals.

Bedford Tool Appoints Representative

Bedford Tool & Forge Co., Bedford, O., manufacturer of hand and pneumatic chisels and other tools, appointed Gurley-Ortman Inc., Chicago, as its representative in that area.

New Ferrosilicon Plant Opens

Ferrosilicon is flowing from the new, unfinished $8 million plant of Vanadium Corp. of America near New Haven, W. Va. Output of the five new furnaces should find a ready market since steel producing facilities are approaching the 120-million-ton annual goal.

E. B. Metal and Omega Tool Move

E. B. Metal Products Co. Inc. and Omega Tool & Stamping Co. Inc. moved their factories and offices to larger and consolidated quarters at 12-12 Bridge Plaza South, Long Island City, N. Y.

Foxboro Enlarges Training Staff

Foxboro Co., Foxboro, Mass., increased its training school staff with appointment of W. H. T. Furry as an associate director. The augmented staff will provide an increasing variety of training programs in process measurement and control, attended by engineers and instrument maintenance men from practically every industrial field.

Algoma Steel Gets New Facilities

Rust Furnace Co., Pittsburgh, completed three new batteries of soaking pits for Algoma Steel Corp. Ltd., Sault Ste. Marie, Ont. An additional battery of the three-hole soaking pits and one new billet heating furnace are scheduled for completion shortly. The new 80-ton capacity furnace will

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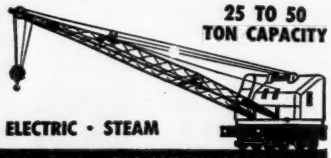

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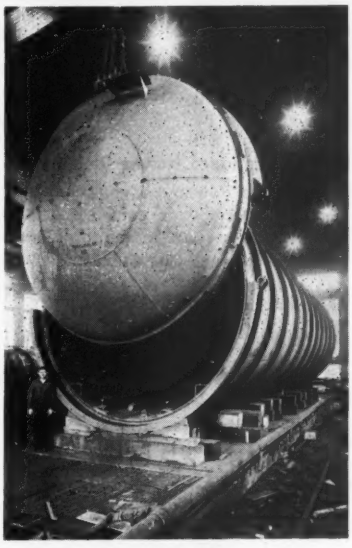

Cures Fuel Cells

This vulcanizer, one of the largest ever built by Biggs Boiler Works Co., Akron, will be used by Goodyear Tire & Rubber Co. for curing large fuel cells for the Army's huge B-52 jet bomber. Inside diameter is 15 feet and over-all length is more than 45 feet. It was tested and approved at 200 pounds pressure per square inch

serve a new combination bar and strip mill of Algoma Steel. The four new batteries of soaking pits will serve a blooming mill, supplementing three existing batteries of Rust pits and permitting an increase in the mill's rolling capacity.

American Stamping Moves to Euclid

American Stamping Co., manufacturer of light and heavy metal stampings, dies, tools and jigs, is moving from its present location in Cleveland to its new plant at 26650 Lakeland Blvd., Euclid, O.

B. Shapiro Erects Plant Addition

B. Shapiro & Co. Inc., Baltimore, dealer in nonferrous scrap metals and steel specialties, is erecting a plant addition. Morton M. Shapiro is president.

Erie Iron Buys Castings Firm

Erie Iron & Supply Corp., Erie, Pa., purchased a foundry and machine shop at Laurelton, Pa., known as the Central Pennsylvania Castings Co. Henry L. Zacks, president, Erie Iron, says the purchased firm probably will continue in operation.

Machinery Firm Names Distributor

Hartford Special Machinery Co., Hartford, Conn., appointed Macaulay Machinery Co. Inc., Schen-

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Exit Snowshovels

The outside maintenance men of the William Penn Hotel, Pittsburgh, can relax next winter. This concealed heating system being installed in the sidewalks around the hotel will keep them free of dangerous ice and snow without any backbreaking shoveling. This grid of wrought iron pipes was made by A. M. Byers Co., Pittsburgh

ectady, N. Y., as exclusive representative in the Rochester-Syracuse-Schenectady area for its line of special drilling and tapping machinery, thread rollers and die polishers.

Du-Lite Chemical Moves to New Plant

Du-Lite Chemical Corp. completed the transfer of all operations to its new plant on River road, Middletown, Conn. The company now has enlarged facilities for producing metal finishing and blackening chemicals and several new products.

Yankee Engineering To Expand

Yankee Engineering Specialty Co., Baltimore, manufacturer of materials handling equipment, such as hand trucks, electric lift trucks, dollies, conveyors, etc., plans to erect a plant addition, containing about 2000 square feet.

Brockhouse Builds in Canada

J. Brockhouse & Co. (Canada) Ltd. Toronto, acquired an industrial site near that city on which construction work on the first unit of a plant will be started immediately. This unit will cost about $500,000 and will be used for manufacture of rolled section molding, using the cold forming process. The Canadian company is a subsidiary of a firm of the same name located in West Bromwich, England, and which has plants in England, United States and South Africa.

Parker Appliance Names Distributor

Hydraulic Power & Equipment Co., Portland, Oreg., was named distributor for O-ring seals manufactured by Parker Appliance Co., Cleveland.

AMF Buys Leland Electric Co.

Leland Electric Co., Dayton, O., will become a division of American Machine & Foundry Co., New York, this month. Purchases of Leland, which has plants in Dayton and Guelph, Ont., will bring AMF's plant total to 16. Present management of Leland will continue. Leland manufactures one-eighth to five horsepower electric motors, generators, alternators and inverters.

Curtiss-Wright Project Approved

Curtiss-Wright Corp., Buffalo, received permission from the city zoning board of appeals to go ahead with a $10 million expansion program at its metals-processing division. The program calls for erection of a $1.6 million building adjacent to the existing plant, and construction of a $3.3 million building which will house a $3.7 million 12,000-ton extrusion press. The press will produce hollow propeller tubes out of metal billets.

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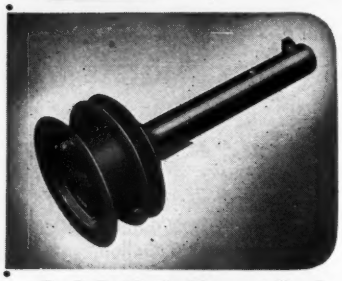

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Sylvania Expands Buffalo Plant

Radio & Television Division, Sylvania Electric Products Inc., Buffalo, took over additional manufacturing space in the old Pierce-Arrow plant for use in production on government contracts. The new operation is expected to get under way late in July or early August.

Lee Engineering Co. To Move

Lee Engineering Co., Baltimore, general machine shop work, plans to move into 5200 square feet at 3219 Fairlaw Ave., that city, thus doubling its operating space.

Holman-Vulcan Association Dissolved

An announcement by Holman Machines Ltd., Toronto, Ont., says that the association between Vulcan Iron & Engineering Ltd., Winnipeg, and Holman Bros. Ltd., Camborne, England, operating under the name of Holman-Vulcan Ltd., has been dissolved. Each company will operate separately in Canada.

Enthone Licenses West Coast Firm

New manufacturing and distributing facilities in eight western states were established by Enthone Inc., New Haven, Conn., producer of metal finishing processes. L. H. Butcher Co., Los Angeles, was granted an exclusive license to manufacture products in Los Angeles to serve the Pacific Coast states and British Columbia. Enthone compounds are used for plating on aluminum, blackening metals, derusting and pickling, plate and paint stripping, and metal cleaning.

Joseph Co. Plans Canadian Plant

N. C. Joseph Co. Ltd. of England will establish a plant in the Niagara Falls, Ont., area soon and will operate it as the Joseph Aluminum Co. of Canada Ltd. It will make chrome plated aluminum table ware.

Isotope Products To Build Plant

Isotope Products Ltd., Toronto, Ont., awarded a contract for construction of a plant near Oakville, Ont., which will produce equipment to harness radioactivity to industrial use. Present production is being conducted in temporary quarters at Oakville.

Hampton Gets Control of Mosebach

Majority stock of Mosebach Electric & Supply Co., Pittsburgh, was acquired by Ray Hampton and L. H. Hampton. The company is expanding the number of items manufactured for mines, mills and railroads. Ray Hampton is president.

Snell Enlarges Supplee Laboratories

Foster D. Snell Inc., New York firm of consulting chemists and engineers, will construct the second unit of its Supplee Laboratories Division, Bainbridge, N. Y.

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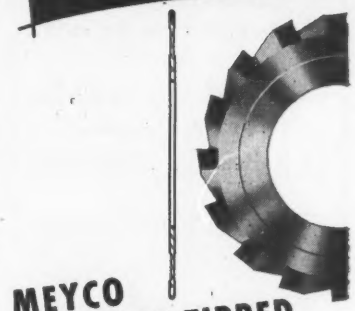

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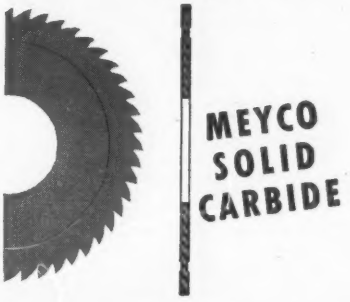

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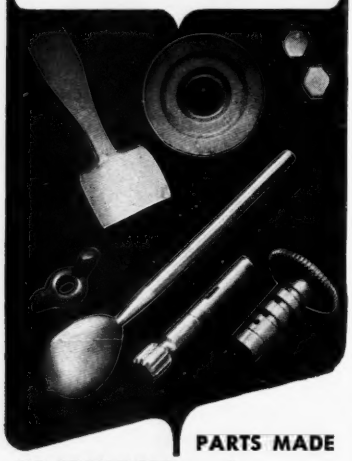

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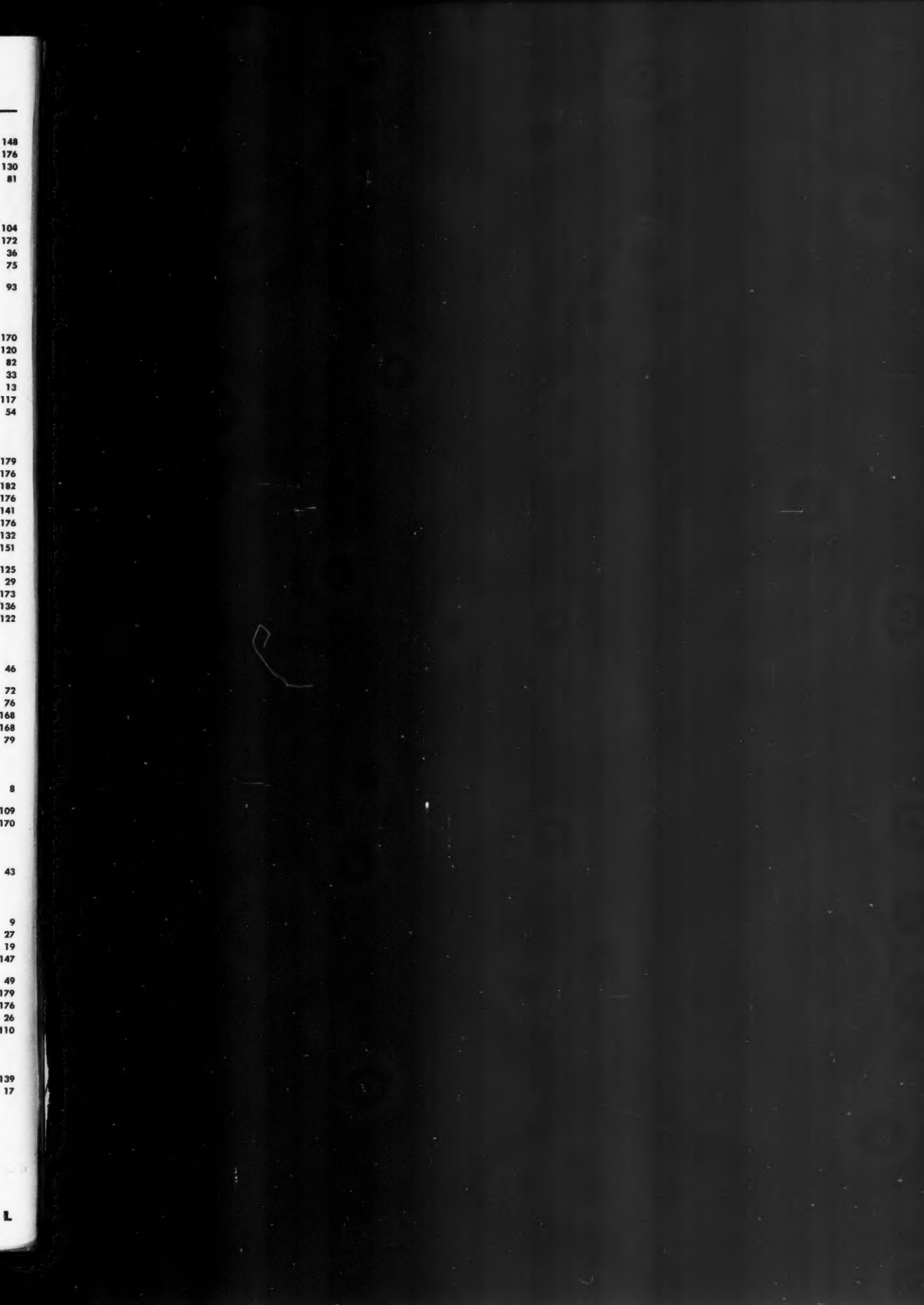
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